



Jennifer Schluer (ed.)

DIGITAL FEEDBACK IN HIGHER EDUCATION

Teaching Practices,
Student Voices, and Research Findings

[transcript] Digital Society

Jennifer Schluer (ed.)
Digital Feedback in Higher Education

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and Research Findings

[transcript]

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Foreword

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About this Book

In today's rapidly evolving educational landscape, this book aims to support teachers and researchers in exploring the ever-expanding domain of digital feedback. It approaches innovative educational practices from multiple perspectives while foregrounding learners' active engagement and discussing consequent changes in teachers' responsibilities and curriculum design. By including contributions from graduate students, teachers and researchers, it underscores the importance of continuous dialogues between learners, scholars and practitioners to reimagine feedback processes in the digital age.

This edited volume demonstrates the thematic breadth and practical use of digital feedback with a special emphasis on emerging trends and technologies, including the use of social media and artificial intelligence. It seeks to give readers inspirations for innovating feedback processes in their own classrooms, in alignment with the specific learning objectives they aspire to reach. Recognizing the dynamic nature of technology, the book advocates ongoing exploration, critical reflection, and empirical investigation to improve feedback processes and learning outcomes. Accordingly, a distinctive feature of this edited volume is that it combines three types of contributions: (1) papers on empirical studies or research projects; (2) reports on teaching practices or reflections of pedagogical designs; (3) descriptions of teaching ideas for feedback activities.

Altogether, the edited volume comprises 17 chapters in five thematic sections. The introductory section sets the stage by offering an overview of a comprehensive research project on digital feedback in teaching and by outlining the scope of the subsequent contributions. Section II is devoted to pedagogical (re-)design as a continuous endeavor to improve teaching and learning and serves as an inspiration for rethinking feedback processes in higher education. Section III unites students' perspectives, teachers' experiences as well as research findings on learners' and lecturers' roles and responsibilities in the digital feedback process, with a particular focus on learner engagement. Section IV serves to illuminate the potentials of social media for student-centered feedback exchanges while also discussing associated challenges and possible solutions. The closing section V focuses on the utilization of generative AI for a variety of feedback purposes,

considering its roles in feedback training and as feedback assistants for learners and teachers.

Overall, this comprehensive, critical, creative, and collaborative exploration of digital feedback in education fills a significant gap in the literature, emphasizing the necessity for a continuous development of digital feedback literacy among both teachers and learners to navigate and innovate dynamic educational environments.

Information about Funding

The project, the conference and the publication would not have been possible without funding. First of all, I would like to thank the *Stiftung Innovation in der Hochschullehre* for their financial support as part of the project “Didaktische Orientierung für digitales Feedback (Pedagogical Guidance for Using Digital Feedback): Digital Feedback Map (DFM)” (project ID: FRFMM-181/2022, project duration 09/2022-11/2023). Second, as far as the funding of the conference “Spotlight on Language Teaching: Digital Feedback in Research and Practice” (June 2023) is concerned, I extend my thanks to the *Technische Universität Chemnitz* (Chemnitz University of Technology) as well as the *Deutsche Gesellschaft für Fremdsprachenforschung* (German Association for Foreign Language Research). Third, I gratefully acknowledge financial support for the publication of the open access book that was granted by the *Sächsische Staatsministerium für Wissenschaft, Kultur und Tourismus* (Saxon State Ministry for Science, Culture and Tourism) as well as by the *Universitätsbibliothek Chemnitz* (Chemnitz University Library). In that respect, I direct my special thanks to the library’s open access team for their useful advice.

Moreover, I would like to express my thanks to all research assistants, student assistants, lecturers and students who were involved in the project, the conference, and the book preparations. Their specific contributions are acknowledged in the individual chapters of this book. Finally, I deeply thank all contributors to this volume for sharing their ideas and submitting their chapters in a timely and reliable manner. Their different and complementary perspectives make this volume a well-rounded publication with many promising directions for future research and teaching practice.

Section I:
Introduction

Introduction to Digital Feedback in Research and Teaching: The Project, the Conference, the Current Book

Jennifer Schluer

Abstract *This introductory chapter serves three purposes: first, to present the aims and scope of the project “Pedagogical Guidance for Using Digital Feedback” as well as its main product, the “Digital Feedback Map” (DFM); second, to report about the contents of the conference “Digital Feedback in Research and Practice” that took place from June 29 to 30, 2023, in hybrid format; third, to provide an overview of the chapters that are part of this volume. The conference and this book demonstrate the thematic breadth and practical relevance of digital feedback in education, consider both technology-generated and technology-mediated feedback, and provide insights into teaching practices and research projects around the globe. A distinctive feature of the conference and this edited volume is that it combines three types of contributions: (1) papers on empirical studies or research projects; (2) reports on teaching practices or reflections on pedagogical designs; (3) descriptions of teaching ideas for feedback activities. This way, the book underscores the importance of continuous dialogues between scholars and practitioners to enhance pedagogical designs and open new avenues for future research.*

Keywords *digital feedback; pedagogical design; higher education; research project; international conference*

1. Introduction

Technology-enhanced and technology-generated feedback processes have become increasingly important in recent years, not the least due to the proliferation of online and hybrid teaching since the Covid-19 pandemic as well as due to the rapid developments in the field of Artificial Intelligence (AI). Already before the pandemic, I have been active in the field, and due to the increased relevance of digitalization I published the book *Digital Feedback Methods* in 2022. I have been granted a Digital Fellowship by the Saxon State

Ministry for Science, Culture and Tourism¹ and a fund for the project “Pedagogical Guidance for Using Digital Feedback: Digital Feedback Map” (DFM) by the *Stiftung Innovation in der Hochschullehre*².

Despite the remarkable technological developments, recommendations for teaching practice have remained rare, especially those that are supported by empirical findings. The DFM project, the *Digital Feedback* conference, and this volume contribute to filling this gap. In the DFM project, different digital feedback methods were implemented and researched in order to derive empirically-based recommendations for the use of digital feedback in teaching. Section 2 will go into more detail about the project aims and its main product, the “Digital Feedback Map” (DFM). Another means to strengthen dialogue between researchers, teachers, and students was the international and interdisciplinary *Digital Feedback* conference that was hosted by the TESOL section of Chemnitz University of Technology, Germany, from June 29–30, 2023. The brief conference report in section 3 demonstrates the rich variety and relevance of digital feedback in education. Several presenters also seized the chance to submit a paper for the current volume, which intends to combine the insights gained from the DFM project and from the conference. Additionally, it aims to sketch avenues for future research and teaching practice based on recent developments. In that regard, section 4 will outline the book contents before this chapter will close with a short reflection. Altogether, the results from the DFM project and the external contributions serve to provide mutually enriching perspectives.

2. Aims and Output of the DFM Project

This section will explicate the aims of the project “Pedagogical Guidance for Using Digital Feedback” and introduce its major product, the “Digital Feedback Map” (DFM).

2.1. Objectives of the DFM Project

The project was driven by several factors. First, ever since Hattie’s (2009) meta-analysis of educational research, the importance of feedback has been increasingly recognized and the interest in researching it has widely grown. This had resulted in a fundamental reconceptualization of the feedback construct, from unidirectional delivery of (corrective) information, typically by teachers to students, towards feedback dialogues that are actively co-constructed by all agents within specific socio-material and socio-cultural environments (see the reviews by Schluer, 2022, pp. 16–17; Schluer et al., 2023).

Indeed, there are various feedback media and technologies available that can unfold their distinct benefits if they are used adequately. This means that not only the quality of feedback in terms of its content is important, but that feedback methods should be

1 Full project title: “DigiFeed – Digital feedback to help you move forward in your academic career”; project duration: 07/2021-12/2022.

2 Full project title: “Didaktische Orientierung für digitales Feedback (Pedagogical guidance for using digital feedback): Digital Feedback Map (DFM)”; project ID: FRFMM-181/2022; project duration: 09/2022-11/2023.

used appropriately with regard to the learning goals and needs of the learner as well as other contextual factors (cf. Schluer, 2022). Such a pedagogically motivated use of digital feedback methods can help to improve feedback and learning processes, boost students' motivation, enhance the quality of teaching and increase students' learning gain. However, research on adequate pedagogical designs for effective feedback exchanges is scarce, especially with regard to the affordances and effects of different digital tools.

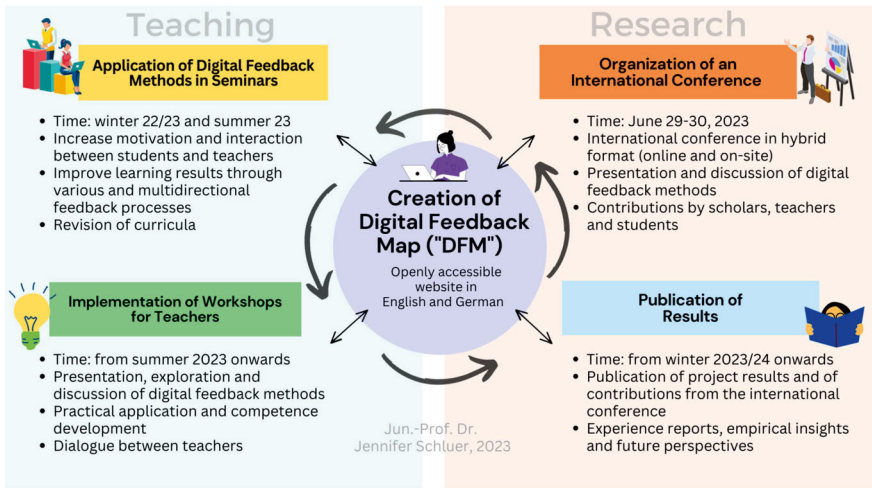
In line with contemporary conceptualizations, the active involvement of students (learner feedback literacy) and teachers (teacher feedback literacy) is of central importance (see e.g. Boud & Dawson, 2023; Carless & Boud, 2018; Carless & Winstone, 2023; Winstone & Carless, 2020). Therefore, the DFM project aimed to explore and evaluate the use of digital feedback methods by involving teachers and examining students' perspectives. Seminars were redesigned with digital feedback processes that aimed to foster students' feedback literacy while they engaged in specific tasks (see chapter 2 by Schluer in this volume for details). In that respect, appropriate task formats had to be created that allowed students to solicit feedback, provide it, obtain and discuss it, as well as evaluate and implement it as needed. To this end, the lecturers (as well as the participating pre-service teachers) also had to develop a basic understanding of feedback as dialogue and continuous learning support, to become familiar with different design options for digital feedback, assess the benefits and limitations of different technologies and to utilize digital feedback themselves. Both teachers and learners thus need to negotiate a common understanding of feedback (feedback as learning support and continuous dialogue to achieve learning goals), cultivate awareness of the benefits (why should I use digital feedback?) and potential areas of application (when should I use digital feedback?) as well as develop the required skills for their effective use (how can I use digital feedback?).

This complex change management project comprised several concrete steps to reach the overall goals in an iterative process. These included

- (1) the incorporation of digital feedback methods in the TESOL seminars (and beyond);
- (2) research about the effectiveness of their implementation from learners' and teachers' perspectives;
- (3) continuous communication about the project and attracting interest among a growing group of relevant stakeholders, e.g. within the institute, the faculty, the rectorate and other universities or educational institutions;
- (4) the organization of specific events to deepen and broaden the discourse as well as exchange of best practices and research findings, such as through an international and interdisciplinary conference and workshops with teachers;
- (5) the creation of an online platform, the "Digital Feedback Map (DFM)", to assist teachers and learners in using digital feedback within their unique educational contexts.

Figure 1 provides an overview of the various stages and sub-goals:

Figure 1: Aims of the DFM Project



Regarding point 1, the application in seminars, all TESOL courses were redesigned with digital feedback procedures as part of the project as well as a few further seminars within the English department. A detailed description is given in chapter 2, which also outlines ideas for further modifications based on the insights that were gained from the analysis of questionnaire data, feedback products and lecturer perceptions. To create sustainable effects, the degree program was revised in a collaborative effort by the institute members. As a result of this process, the new module “Digital Skills” was anchored in the official curriculum with the two courses “Digital Learning” and “Digital Teaching”.

Second, an international and interdisciplinary conference was held to facilitate a wider exchange and to share as well as discuss the knowledge gained. Further details are described in section 3 below. Several chapters in this volume also emerged from that conference, testifying to the sustained interest in the topic of digital feedback. For further networking and dissemination, the project head and/ or a research assistant participated in external events, e.g. workshops and conferences. Moreover, the participation in the “Digital Change Agent” program (organized by the Higher Education Didactics Center of Saxony) proved to be useful for professionalizing the project further and for increasing its interest among higher education staff. Further channels for project-related communication were the project website, project videos, press releases and social media posts.

Overall, the aim was to achieve a “first-order change”, i.e. an optimization within the existing contextual conditions, while supporting further expansion incrementally and thus continuous change over time (Schmidt, 2022). This goes along with the constantly evolving technological possibilities, which demand continuous critical reflection. In that regard, also the main product of the project is to be understood as open-ended. The “Digital Feedback Map” (DFM) platform was created to provide teachers and learners with comprehensive information about digital feedback methods and to inspire their use. To this end, extensive literature searches were carried out and several digital feed-

back methods were implemented in the seminars. This main product will be described in greater detail below.

2.2. The “Digital Feedback Map” (DFM)

The “Digital Feedback Map” (DFM) is a comprehensive online platform that has been designed to support teachers and students in exploring and implementing a variety of digital feedback methods. It maps the terrain of digital feedback methods that educators and learners can navigate by entering <https://tinyurl.com/DigitalFeedbackOverview> in their web browser (Schluer, 2023). For creating the DFM, the application Genial.ly was chosen as it allows for an interactive linking of various elements, thus helping to effectively represent the manifold connections and possibilities that digital feedback offers. A screenshot of the start page is given in Figure 2.

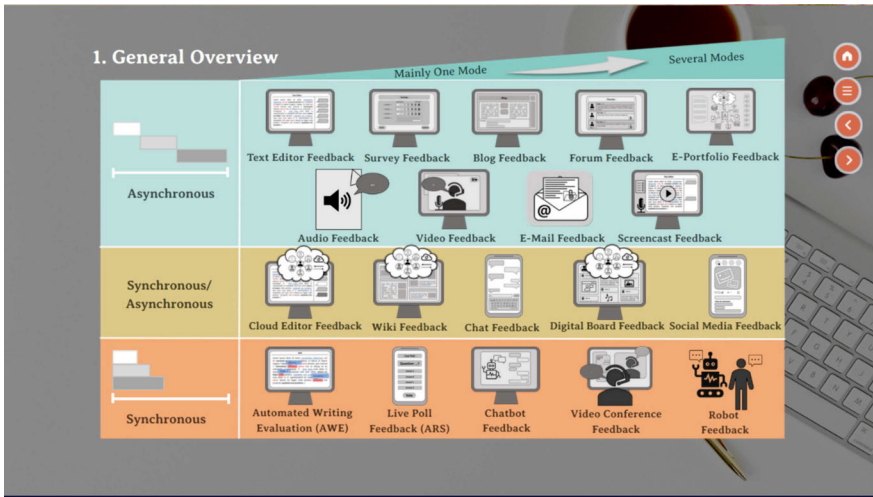
Figure 2: Start Page of the Digital Feedback Map (English Version)



With its interactive features, the DFM seeks to empower educators and learners to incorporate feedback practices effectively in the digital age. By clicking on “Start”, the users will be directed to the “Table of Contents” from which they can access a general overview or retrieve specific information via different filters, including feedback directions, modes, timing, and assessment criteria. This classification allows users to conveniently compare different digital feedback options, select the most suitable ones and align them with their learning environments and teaching objectives.

Altogether, the scope of digital feedback methods has grown from fifteen (as depicted in the book by Schluer, 2022, p. 55) to nineteen during the DFM project, as shown in Figure 3.

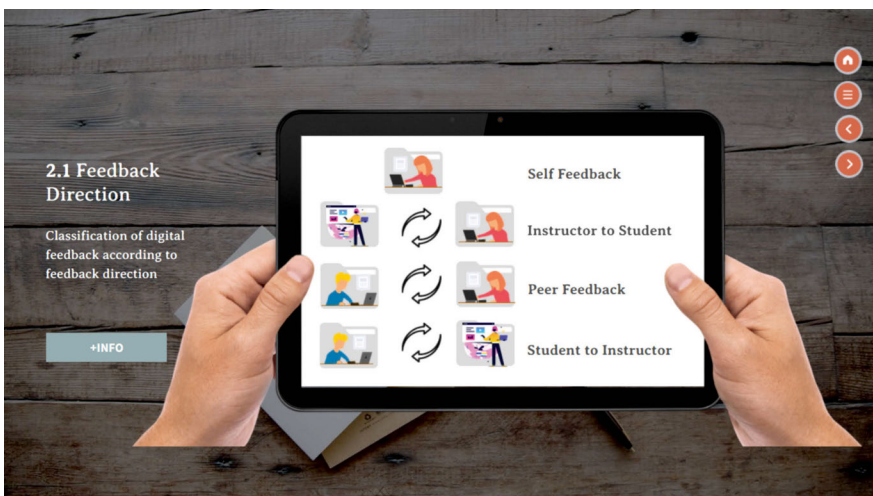
Figure 3: General Overview of Digital Feedback Methods Included in the DFM (Screenshot)



The four newly added digital feedback methods are feedback on social media, on digital boards, via chatbots, as well as robot-assisted feedback. Previously, feedback on digital boards was contained in the category of cloud-based feedback (Schluer, 2022), but since it was found that cloud-editors (e.g. *Google Docs*) and digital boards (e.g. *Padlet*) can enable or restrain feedback processes in quite different ways, it was decided to treat them separately on the DFM.

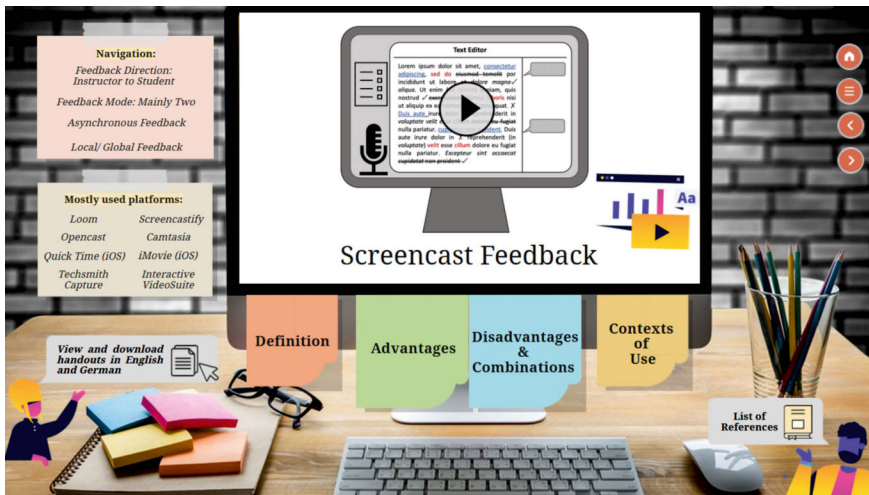
Aside from the general overview page, the different digital feedback methods can be accessed via specific filters, such as the ones in Figure 4.

Figure 4: Screenshot of the Filter Page “Feedback Direction” from the DFM



Users can click on each option to obtain further information and suggestions for possible digital feedback methods. When choosing a specific method, users will access a dedicated page that provides a comprehensive description of it, including its definition, its advantages and disadvantages as well as potential combinations with other feedback methods. Through these combinations, users can amplify the strengths or mitigate the weaknesses of single feedback methods. A sample screenshot of a method's main page is provided in Figure 5.

Figure 5: Sample Main Page of a Digital Feedback Method on the DFM



As can be seen, the page additionally contains a feedback navigation section, together with the most used tools or platforms for that method. Owing to its interactivity, teachers and students can visit these platforms by simply clicking on their names. Users can also access handouts in both German and English that summarize the key points about each method, together with tasks for knowledge testing and reflection. These handouts can readily be used in teacher education or teacher training, e.g. in workshops or seminars, as well as in the classroom to familiarize students with the designated digital feedback method.

Especially for educators and prospective teachers, the contexts of use section is particularly interesting. It provides them with guidance on how to apply each feedback method. For each of them, suitable learning objectives, learner groups, subjects/disciplines, learning environments, and assignment types are elaborated on this page. Additionally, users can download sample tasks as well as access video manuals which serve as “how to” tutorials. Two sample pages are given in Figure 6 and Figure 7, respectively.

Figure 6: Contexts of Use Page for Cloud-Editor Feedback (Screenshot from the DFM)

CLOUD EDITOR FEEDBACK

Contexts of Use

Learner Groups

- Very useful for peer feedback due to their collaborative functionalities (e.g. Aydarwati, 2019; Ebadi & Rohimi, 2017).
- Teacher feedback (e.g. Saeed & Al Qunayeer, 2020; Shintani & Aubrey, 2016; Yin, Zheng, & Warschauer, 2017).

Using Google Docs for Feedback Purposes

Learning Objectives

- Appear to be particularly suitable for supporting learners in the process of completing a task, for instance when drafting a text.

Subjects/ Disciplines

- The cloud editor can be used in a variety of different disciplines. Also, teachers can choose different Cloud Applications for feedback depending on the type of assignment.

Sample Tasks & Manuals

Click the items below to view/ download written manuals on Google Drive

Google Docs

Learning Environment

- Online Class
- Hybrid Class
- Blended Learning
- Face-to-face Class

Assignment Types

- Similar to text editor feedback, cloud editor feedback is mostly used to provide feedback for written tasks, such as essay, term paper, research proposal, etc.

Figure 7: Contexts of Use Page for Social Media Feedback (Screenshot from the DFM)

SOCIAL MEDIA FEEDBACK

Contexts of Use

Assignment Types

- All different kinds of assignments, including but not limited to written tasks, video/ audio tasks, designing/ illustration/ creative tasks, group work. "The educational content shared on social media can be any form of text, audio or video, etc." (Sengupta & Vaish, 2023, p. 2)

Sample Tasks & Manuals

View/ download written manuals on Google Drive	Application name	Watch video tutorials on YouTube
	Instagram	
	TikTok	
	Twitter	
	YouTube	
	Facebook	

Learner Groups

- Mostly adopted in higher education and professional education settings, though students from other levels were also seen in studies (e.g. in Aruichevan et al., 2019)

Subjects/ Disciplines

- A great variety of disciplines, such as language learning (Tran & Pham, 2022), teacher education (Suana et al., 2019; Lin et al., 2013), accounting (Liu, 2019), engineering (Evans, 2013), nursing (Almutairi et al., 2022), etc.

Learning Environment

- Online Class
- Hybrid Class
- Blended Learning
- Face-to-face Class

Learning Objectives

- Suitable for formative and summative purposes.
- Because of its linstancy and interactivity, it is useful for feedback from different directions, including teacher feedback, peer feedback, student feedback, or a combination of these.

By now, the DFM contains a total of 38 comprehensive handouts (19 German, 19 English), 51 task manuals and 27 video tutorials for the 19 digital feedback methods. However, since technologies are constantly evolving, the DFM will also be updated continuously. Notably, this pertains to rapid advancements in the field of AI (see section V of this volume) and robot-assisted feedback, but also feedback processes on social media and other platforms that deserve further exploration and empirical testing in dialogue with teachers and learners (see section IV). As with any innovation and established practice, critical reflection on their usefulness is essential. Readers are therefore invited to seize the DFM as a portal to understanding, comparing, and selecting the most suitable dig-

ital feedback methods for their unique educational contexts, testing their effectiveness, and modifying existing practices as needed. The conference and chapters in this volume were and are meant to facilitate and encourage such transformative practices, as will be detailed next.

3. Report on the Digital Feedback Conference

From June 29 to 30, 2023, the first international conference on “Digital Feedback in Research and Practice” took place in a hybrid format at Chemnitz University of Technology, Germany. Participants were able to join the event online in BigBlueButton or on-site in Chemnitz.

The conference was organized by myself, Assistant Professor Dr. Jennifer Schluer, and supported by my team at the TESOL section in the English department. The call for abstracts and the conference attracted wide interest among researchers, students and teaching staff from different disciplines and educational institutions.

3.1. Overview of Scope and Procedure

At the two-day conference, 28 presentations underscored the thematic breadth and practical relevance of digital feedback in education. In addition to the conference opening and conference closing speech, there were 19 presentations reporting about research projects and teaching practices, 5 pitch presentations of teaching ideas, and 4 poster presentations. The presentations were organized into six thematic sections, offering mutually enriching perspectives:

- (1) Audio-Visual and Multimodal Feedback
- (2) Automated Feedback and Automatic Corrections
- (3) Open AI, iCALL & Robot-Assisted Feedback
- (4) Digital Feedback Literacy: Teacher and Student Perspectives
- (5) Pedagogical Feedback Designs and Teaching Reports
- (6) Interdisciplinary Insights on Digital Feedback

The presenters either joined the conference online or presented on-site in the lecture hall. Some had recorded their presentations beforehand to ensure that their contribution would be played despite unstable electricity and internet availability (notably from Ukraine and South Africa).

Altogether, the presentations dealt with technology-mediated and technology-generated (automated) feedback, including written electronic feedback as well as audio-visual and multimodal feedback. They explored a variety of tools that can be used for feedback purposes and presented possible pedagogical designs as well as suggestions for their meaningful integration in teaching. The contributions offered insights into teaching around the globe, not only in English language teaching, but also from a number of other disciplines, such as literature studies or media psychology. They contributed to the understanding of various digital feedback tools and methods from diverse perspectives,

including both learners and teachers in face-to-face and online learning environments. In that regard, they incorporated empirical data from teaching implementations, survey research or feedback product analyses, to name just a few. They discussed course designs and methodological frameworks to foster students' and teachers' feedback literacies and suggested practical ideas for teaching in a variety of educational settings.

More precisely, the program offered rich insights into research and teaching practices by presenters from Turkey, Ukraine, Iran, China, Palestine, Russia, Singapore, South Africa, India, the United States, as well as Germany, Austria and Switzerland. Furthermore, the hybrid format enabled audience members from around the world to engage in lively discussions with other online participants or on-site attendees. The following sections will provide more information about the thematic scope that was discussed at the Digital Feedback conference³.

3.2. Contents of the Thematic Sections

In the thematic section of **audio-visual and multimodal feedback**, the first group of presenters exemplified the utilization of screen-capture feedback for the development of writing skills in the EFL (English as a foreign language) classroom (Detlef Eichner), explored the effects of self- and peer-annotated video feedback for the improvement of metacognition (Sumeyya Sarikaya), and analyzed error frequencies and (non-)corrective feedback provision in two types of videoconferencing, i.e. studio-based and desktop videoconferencing (Julia Lankl).

The second group of presenters in the thematic section of **automated feedback and automatic corrections** drew attention to the affordances and limitations of technology-generated feedback from teachers' and students' points of view. The presenters explored writers' cognitive, behavioral and emotional engagement with technology-generated feedback (Ralf Gießler), and discussed learners' emotional perception of feedback in mobile language learning apps, including issues of accuracy and audiovisual effects (Jennifer Wengler). In addition, video-recorded audiovisual translation was explored as a means of immediate feedback for foreign language learners (Nataliia Saienko & Ganna Sozykina).

In the third thematic section of **Open AI, iCALL & robot-assisted feedback**, the presenters showcased the utilization of ChatGPT for the generation and application of assessment rubrics on students' writing (Kemal Gönen), discussed the strengths and weaknesses of a variety of intelligent computer-assisted language learning applications with regard to personalized feedback provision (Bushra Ahmad & Mohammad Rizwan Khan), and suggested research avenues for using different feedback modes of humanoid robots to improve the learning of ADHD students (Mina Raeisi Nafchi).

In the fourth section, the focus was set on the **digital feedback literacy of teachers and students**. The presenters highlighted the important role of teachers in encouraging students to express their feedback needs (Annika Brück-Hübner), provided insight into digital teaching and feedback processes in large classrooms (Verbra Pfeiffer), and

3 The full program and book of abstracts can be accessed at the conference website: <https://www.tu-chemnitz.de/phil/english/sections/tesol/digifeed2023.php>.

emphasized the importance of various facets of learners' and teachers' digital feedback literacies, for example with regard to languages for specific purposes (Olivia Rütli-Joy).

Elaborating on these ideas, the fifth group of presenters discussed **pedagogical designs** to foster dialogic feedback in synchronous and asynchronous digital modes, both in face-to-face and online classrooms (Katja Anderson & Natasha Anderson), investigated the effects of digital feedback activities to foster pre-service teachers' self-efficacy in a curriculum planning course (Yarong Liu), and explored learners' perceptions of criteria-based peer feedback in online DaF (German as a foreign language) exam preparation courses (Ines Paland-Riedmüller & Simone Weidinger).

The final group of presenters provided **interdisciplinary insights** and contributed to understanding the development and enactment of digital feedback literacy further. Notably, they explored the utilization of apps for goal setting and time management to create a more efficient and self-regulated learning experience through feedback on study time (Manuel Schmitz, Jenny Rettstatt, Markus Suren, Daniel Brand, Katharina Jahn, Günter Daniel Rey & Marco Ragni).

Additionally, **pitch presentations of teaching ideas** were held by international PhD and Master's students from Chemnitz University of Technology. The presenters offered myriad ways of integrating technological tools for the provision of feedback, including tandem learning and feedback in videoconferencing (Amanda Chng), digital feedback portfolios on Google Sites (Ola Shakhshir), as well as possible feedback procedures on the platforms Flip (Polina Gantman), TikTok (Erhan Altay) and Instagram (Ezgi Irem Bekci).

The conference also included presentations of initial findings from Jennifer Schluer's research about peer screencast feedback in English language teacher education as well as about the use of synchronous and asynchronous digital feedback methods that were part of the project "Pedagogical Guidance for Using Digital Feedback: Digital Feedback Map" (see section 2 above). Finally, four **poster presentations** provided additional insights into these projects in a bilingual manner.

3.3. Review Process

Each conference abstract was reviewed by two independent scholars who rated the submissions according to their overall relevance and assessed it along the following review questions and criteria:

- Are the abstract contents relevant to the conference theme? Overall score:
 - (1) = low compatibility with conference theme
 - (2) = intermediate compatibility with conference theme
 - (3) = high compatibility with conference theme
- Is the presentation topic important? Will it be interesting for the other conference participants/ the audience?
- **For empirical papers:**
 - Is the research gap & research goal clearly stated?
 - Is there a reference to the previous literature?
 - Are the methods, data collection and analytical procedures appropriate to the research goal? Have they been described in a transparent manner?

- Is it original/ innovative work? Does it present new data?
- Is the analysis completed, or will it be completed before the conference?
- Are there any results already and are they discussed against the previous literature?
- Are the results relevant for teaching? Do they state what future work could be done (based on the findings)?
- **For teaching reports and teaching ideas:**
 - Is it new/ innovative?
 - Would it be interesting for other teachers?
- Is the abstract clearly written and well-organized?
- **Further remarks, open questions and suggestions:**
 - E.g., abstract too long, wrong citation style, anything special about the topic?
 - Open questions arising from the abstract.

The abstracts that fulfilled the review criteria with a score of (3) given by both reviewers were accepted for presentation at the conference. Abstracts which received a lower score but appeared promising and innovative had to be revised in order to be accepted. Abstracts that did not fulfill the criteria at all were rejected.

A similar procedure was applied to the paper submissions for the present book. An overview of the accepted chapters will be provided below.

4. Overview of Chapters in this Volume

In the initial call for conference contributions, the presenters and audience members were informed about the possibility to submit a chapter for the conference book after the event had taken place. Thus, not only the presenters at the *Digital Feedback* conference, but also a limited number of additional participants had the chance to submit a paper about a research project, a report about their teaching practice or a teaching idea in order to become part of this book. The possible publication types were as follows:

- (1) Empirical papers about a **study or research project**
- (2) Reports about **teaching practice or pedagogical designs**
- (3) Descriptions of **teaching ideas or teaching units**

The chapter contents did not need to fully match the contents of the presentations that were held at the *Digital Feedback* conference. If authors had published their research project elsewhere already (e.g. Gießler, 2024), they were allowed to change their focus, e.g. by writing a methodological paper, for instance about a teaching practice. As Brück-Hübner and Schluer (2023) observed, this methodological information is typically cut short or left out in empirical papers, even though it constitutes valuable information for follow-up research and for teachers who are interested in implementing that teaching approach. Therefore, papers about teaching practices which explicate the pedagogical design underlying the use of digital feedback were considered a welcome addition to the volume. All in all, the aim of the book was to broaden the depth and diversity of the

discussions that took place at the conference. In that respect, it also includes findings from the DFM project in several chapters.

Another particularity of the conference and the edited volume is that they not only feature contributions by researchers and teachers, but also by graduate students, i.e. students who have recently passed their master's degree or are in their final year of studies. This way, they had the chance to gain early experiences with academic publishing, which might encourage a research-based reflective stance in their future teaching or pave the way for an academic career.

The next sections will synthesize the scope of contributions that is immanent in the following 16 chapters of this edited book.

4.1. Section II: Pedagogical (Re-)Design

Following this introductory chapter, the subsequent section is devoted to pedagogical (re-)design as an ongoing endeavor to improve teaching and learning in higher education. In the first chapter of that thematic section, I provide detailed insights into the curricular adjustments and course redesigns that were undertaken in recent years in my subject field. It comprises courses such as the Introduction to English Language Teaching, Digital Learning and Teaching, Curriculum Planning and Materials Development, Classroom Observation and Practical Language Teaching, Academic Study Skills and the TESOL Research Colloquium. Overall, the chapter illustrates the necessity to carefully align digital feedback methods with specific learning objectives.

The second contribution in that section concentrates on a curriculum planning course that was conducted and analyzed by **Yarong Liu**. It pursued two purposes: to support preservice teachers in the process of course planning and materials design by employing digital feedback procedures, while simultaneously fostering their digital feedback literacy as future teachers. The chapter describes the course procedures and results as well as provides a reflective account of the outcomes to propose further improvements of the course design. Moreover, it critically engages with relevant theories to advance a revised conceptualization of teacher feedback literacy.

The third chapter positions the foregoing considerations within a wider frame. It introduces an interactive feedback taxonomy to assist pre- and in-service teachers in the pedagogical planning and redesign process of their own curricula, courses, lessons or tasks. Drawing upon a qualitative scoping review of 135 empirical studies (Brück-Hübner & Schluer, 2023) as well as pertinent literature and practical insights from teacher education, this taxonomy comprises seven major guiding questions which lead to numerous design options. In that chapter, I provide a theoretical and practical frame for feedback design processes at micro-, meso- and macro-levels.

4.2. Section III: Learner Engagement and Teachers' Roles in Feedback Processes

The largest section of this book brings together students' perspectives, teachers' experiences as well as research findings on learners' and lecturers' roles and responsibilities in the digital feedback process, with a particular focus on learner engagement.

In the first chapter, **Annika Brück-Hübner** builds on the learning theory of interactive constructivism to carve out an understanding of feedback as a co-constructive communicative process in which learners play an active role. In that respect, she delineates students' responsibilities in four phases of the feedback process: initiation, communication, reflection and construction, as well as transfer. Subsequently, she presents findings from an online survey that collected student perceptions and experiences about feedback in (digital) higher education in Germany. Specifically, Brück-Hübner analyzed the roles students ascribed to themselves as well as to the lecturers during the phases of feedback initiation and feedback communication (N=111). She concluded that only one third of the students saw themselves in an active role, notably by asking questions but less so by discussing the feedback further with the feedback provider. This primarily passive role contrasts with the calls for learner agency made in the theoretical feedback literature. Her chapter thus serves as an important reminder to put learners and their needs into the center of any feedback process. Indeed, many of the subsequent chapters deal with teaching practices that seek to foster learners' engagement and could therefore help to raise teachers' and learners' awareness of the actions they could take to enact a dialogic and co-constructive conceptualization of feedback.

In the subsequent chapter, **Anna-Katharina Scholz** reports about her own teaching practices and experiences with live polls in the classroom (Audience Response Systems, ARS). She elaborates on four potential ways of using ARS: as check-ins at the beginning of a lesson to collect feedback on how students feel (affective dimension); as a means to inquire into students' prior knowledge about a particular topic, e.g. as part of brainstorming activities (cognitive dimension); as a tool to support group work and mutual feedback (collaborative dimension); as an assessment of what students have learned or remembered about a particular topic (evaluative dimension). Scholz thus moves through different phases of a lesson or course and presents the student feedback she obtained on her implementations of ARS. She discusses the advantages and challenges of using ARS while concluding that they can be valuable and versatile tools in the classroom to foster students' active engagement.

Speaking from the student perspective, **Sara Wohlschläger** likewise foregrounds the importance of actively seeking feedback from the learners. In contrast to teacher-to-student feedback or peer feedback, student-to-teacher feedback has been elicited and investigated to a much lower extent. In that respect, Wohlschläger emphasizes the significance of student feedback as a possible pupil voice strategy to improve the effectiveness of teaching and learning. Following Hattie and Timperley's (2007) as well as Zierer and Wisniewski's (2019) tri-partite distinction between feed-up, feed-back and feed-forward, Wohlschläger delineates several steps to be considered when incorporating digital student feedback activities in the classroom by using visual feedback via *Oncoo* as an example.

Ralf Gießler and Jana Maria Olejniczak likewise expand on Hattie and Timperley's (2007) classification. Specifically, they recommend using a digital board application (*Padlet*) for the pre-writing or drafting stage of a composition task. Since Padlet allows for the insertion and arrangement of multimodal contents, learners can draw on multiple semiotic resources for (pre-)writing and feedback exchanges. Depending on the students' prior knowledge and experience, teachers might need to create elaborate

advance organizers on Padlet to facilitate the composition process and the peer feedback exchange. Taking a unit about the American Dream as an example, the authors explain how such a multidirectional and interactive feedback activity could be conducted.

Indeed, dialogue-based approaches to feedback, such as in peer exchanges, have received increasing attention, even in preparation of traditional high-stakes testing. In their contribution, **Ines Paland-Riedmüller, Simone Weidinger and Anastasia Drackert** propose a learning-oriented approach to exam preparation, which includes learners' criteria-based engagement with peer feedback. They report on their iterative development of the feedback procedures in an online test preparation course for the digital TestDaF, which is a high-stake standardized language proficiency test for language admission to higher education institutions in Germany. In the context of German as a foreign language, they compared different feedback methods and evaluated them via online surveys, including automated feedback, tutor feedback and (multiple) peer feedback. The survey results largely resonated with the tutor's perceptions and pointed to students' better understanding of their performance and of the task objectives when peer feedback was utilized. In view of the challenges that were encountered, the authors underline the importance of training students for peer review.

To train learners' feedback skills, **Amanda Yi Chng** suggests a feedback observation activity as part of tandem learning. Tandem learning is a popular approach in foreign language learning, as it can promote language skills, metalinguistic discussions and cross-linguistic awareness. In her contribution, Chng highlights its potential for fostering feedback skills among e-tandem participants. She proposes that four tandem partners join the activity, with two of them observing the corrective feedback exchange of the other two learners, before their responsibilities are changed. By using a videoconferencing system with multimodal affordances, students are free to choose the modes of their interaction that best cater for their needs.

The purposes, frequency and features of videoconferencing have changed discernibly over the past years, which warrants a close examination to derive recommendations for their purposeful and competent use in educational contexts. In her contribution, **Julia Lankl** focused on two types of videoconferencing and investigated oral corrective and non-corrective feedback processes in the context of learning German as a Foreign Language (GFL). In that respect, she reports on a university project between prospective GFL teachers in Austria and GFL students in Japan and Brazil. By using video interaction analysis, Lankl examined the occurrences of oral errors and subsequent feedback actions and was thus able to expand previously existing category systems. Notably, she discovered that the interlocutors in both settings rarely used corrective feedback after oral errors but frequently employed non-corrective feedback instead, mostly in the form of overlapping listener signals such as 'mhm' and 'okay'. Based on the differentiated findings she obtained, Lankl provides suggestions for improving feedback processes in synchronous computer-mediated communication. This includes a "courage to correct" errors and engage in dialogue with the learners as well as reflection on the teachers' and learners' roles and routines during these feedback exchanges. The study thus fills an important gap that was identified in earlier reviews (e.g. Brück-Hübner & Schluer, 2023). Other under-researched areas pertain to the use of social media and artificial intelligence for feedback purposes. These topics will therefore be addressed in the subsequent sections.

4.3. Section IV: Social Media and Self-Regulated Learning

Social media platforms and apps unite numerous features that can be used beneficially for feedback purposes. While social media have become ubiquitous in everyday life, their utilization in educational contexts is still contested, especially at schools. In the spirit of the book on *Digital Feedback Methods* (Schluer, 2022), the first chapter in this section reviews the advantages and challenges surrounding the usage of social media for feedback purposes. Particular benefits result from the multimodal affordances and creative possibilities as well as the convenient accessibility, which can enhance learner engagement in and outside the classroom. As the utilization of social media might be prohibited in some educational settings, I argue that social media might nevertheless inspire and innovate feedback practices, e.g. by using fake messengers or adapting their features through other tools or platforms. In the chapter, I also provide several concrete suggestions for implementation, e.g. concerning novel video feedback features, hashtags or quick reactions.

Simultaneously, the chapter serves as a bridge to the two teaching ideas that are presented in the ensuing chapters by Erhan Altay and Ezgi Irem Bekci. **Erhan Altay** concentrates on one special feature of TikTok, which is voiceover feedback for student-created videos or slideshows of presentations. He explains the different steps that are needed for its implementation and suggests further utilizations of TikTok for language learning and peer feedback purposes. Notably, he foregrounds students' active engagement that moves beyond the oftentimes passive consumption of social media.

Ezgi Irem Bekci proposes another activity to foster active student learning through collaborative work and peer feedback on social media. She combines the utilization of avatars and story features on Instagram to support students' vocabulary development. More precisely, Bekci describes the steps of creating a virtual avatar, writing dialogues on Instagram stories and exchanging digital feedback via the direct messaging function. She also explains in how far this teaching activity aligns with important theoretical and methodological principles, such as cognitive load theory, constructivism, collaborative learning and authenticity in student-centered learning.

These chapters on social media illustrate their benefits for actively engaging learners in feedback processes. At the same time, they draw attention to common challenges, notably the potential distractions learners might face. The final chapter in this section therefore examines the use of apps that could help students maintain focus by reducing distractions and improving time management skills. **Schmitz, Rettstatt, Suren, Brand, Seemann, Ragni, and Rey** compared three experimental groups, one using the time management app *SuperProductivity*, another one the distraction blocking app *Freedom*, and the third group both apps. The authors argued that automated feedback from these apps might assist students in increasing their productivity and learning progress. However, the researchers did not find any significant differences between the experimental groups and the control groups and discussed several likely reasons for this unexpected outcome. Crucially, students need to play an active part when using these apps, which presupposes clarity about the desired learning outcome. In that respect, the authors also emphasize the importance of prior training, ongoing coaching and regular reflections to support self-regulated learning. The interplay of human competencies and technologies,

notably digital feedback, thus becomes obvious. Surpassing specialized apps, such as those for time management and distraction blocking, AI-based systems have a rapidly growing impact on educational practices. The potentials of AI-supported feedback are therefore explored in the closing section of this volume.

4.4. Section V: Artificial Intelligence in the Feedback Process

Apart from social media, the utilization of artificial intelligence for feedback processes is an emerging and still under-researched field that has quickly grown in popularity in recent years. When generative AI became publicly available through OpenAI's release of ChatGPT-3 in November 2022, it attracted massive attention and led to vivid debates in society and education. Despite this upsurge in interest, its particular affordances for feedback purposes are still under-explored. In the first chapter of this thematic section, I review the available literature on chatbot feedback with a special focus on ChatGPT. Similar to the introductory chapter on social media and the structure of the digital feedback chapters in Schluer (2022), I discuss the advantages, limitations and possible implementations of generative chatbots for feedback purposes. I argue that generative AI offers enhanced benefits as compared to earlier automatic writing evaluation (AWE) systems, but even more so requires critical evaluative capabilities from the users. More precisely, the chapter demonstrates that chatbots can serve as feedback assistants for both teachers and learners and can additionally play a supportive role in the development of learners' and teachers' feedback literacy.

As developments in the field are rapid, the subsequent chapter explores various AI avenues for future research and teaching practice. It discusses existing possibilities and still-prevailing limitations to promote a responsible and critical use of AI. Extending beyond the preceding contribution on chatbot feedback, this concluding chapter looks at other skill areas, notably AI feedback on speaking skills, text comprehension, presentations, lesson planning, and teaching performance. While significant progress has been made, several challenges remain, which warrant attention in future work. In that respect, the closing chapter offers recommendations for future research and pedagogical practice to harness the potentials of AI for feedback purposes on a wider scale.

5. Reflection and Outlook

Collectively, the contributions in this volume underscore the importance of continuously developing students' and teachers' (digital) feedback literacy. With the ongoing evolution of technologies, curiosity in exploring new teaching and feedback methods as well as critical reflection on their suitability and research on their efficacy become crucial. Teachers and students should engage in continuous learning dialogues and critically reflect on both innovations and more traditional feedback methods to foster a conscious and purposeful use. This critical-reflective competence will become increasingly important, especially in view of the growing impact of artificial intelligence and algorithms (see chapters 16 and 17 by Schluer in this volume). Notably, automated feedback and learning

analytics could be used in conjunction with various other sources of knowledge for self-reflection as well as with peer assessment and teacher feedback.

The integration of technology does not restrain feedback processes, but rather amplifies and multiplies them. There is good reason to believe that the use of digital methods can make teaching more collaborative, as digital platforms facilitate communication and collaboration between teachers and learners – even beyond their own classroom. They can benefit from the knowledge and ideas of other teachers and peers from all over the world, gaining not only valuable professional but also linguistic and cultural experience. This helps to broaden their horizons and improves their understanding of complex concepts and contexts. Eventually, the interplay of human and artificial intelligence can aid to create customized learning experiences that respond to the specific needs and interests of individual learners and enrich the learning processes. Overall, then, the use of digital feedback can progressively change the way we teach and learn, making education more accessible, engaging and effective for learners and teachers alike.

As these considerations make clear, the so-called “4 Cs of Education” play a pivotal role for developing digital feedback literacies. They include critical thinking, communication, collaboration, and creativity (Partnership for 21st Century Skills, 2009; Trilling & Fadel, 2009). Feedback itself is a form of communication to improve learning and teaching and it likewise thrives from collaboration in numerous ways. This does not only pertain to productive exchanges between students, teachers, scholars and policymakers, but also to inter- and transdisciplinary projects that might shed further light on the complexities of feedback literacy (see Schluer & Meier, 2024; Schluer et al., 2023). We therefore strive to broaden and deepen the knowledge about digital feedback continuously, e.g. by conducting collaborative projects with researchers from other disciplines. In that regard, we plan to expand the “Digital Feedback Map” (DFM), which currently provides an overview of 19 distinct digital feedback methods, including text-editor feedback, survey feedback, blog feedback, forum feedback, e-portfolio feedback, audio feedback, video feedback, email feedback, screencast feedback, cloud-editor feedback, wiki feedback, chat feedback, digital board feedback, social media feedback, automated writing evaluation (AWE), live poll feedback (ARS), chatbot feedback, video conference feedback, and robot feedback. With technology’s ongoing advancement and the emergence of new digital methods, we are committed to continually updating both existing and new digital feedback methods on the DFM.

Likewise, this book is to be understood as part of a dynamic process, striving to support teachers and researchers in navigating an ever-expanding digital and digitally enriched universe. We hope that the book contents will give readers inspirations for enhancing feedback processes in their own classrooms, in alignment with the specific learning objectives they aspire to reach. Readers are encouraged to contribute to these ongoing discussions and to explore a variety of additional possibilities in the field of digital feedback, digital learning and digital teaching.

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Section II:
Pedagogical (Re-)Design

Redesigning TESOL Courses with Digital Feedback: Reflections on Modifications and Suggestions for Future Exploration

Jennifer Schluer

Abstract *Dynamic changes in society and technology place new demands on graduates, thus making it necessary for universities and educators to continually revise their degree programs and course curricula. These changes are particularly relevant in teacher education, as they can serve as role models for future teachers' reflective practice and ongoing professional growth. The current chapter therefore focuses on higher education courses taken by students who specialize in the field of Teaching English to Speakers of Other Languages (TESOL). It describes the curricular adjustments and innovations that were implemented in recent years, with an emphasis on systematically integrating digital feedback processes to improve learning and develop future teachers' competences. In that respect, the curriculum comprises courses such as an Introduction to English Language Teaching, Digital Learning and Teaching, Curriculum Planning and Materials Development, Classroom Observation and Practical Language Teaching, Academic Study Skills and the TESOL Research Colloquium. The paper reflects on the suitability of the modifications and suggests additional enhancements and explorations to be undertaken in the evolving landscape of TESOL education in the digital age.*

Keywords *TESOL; digital feedback; curriculum development; higher education; reflective practice*

1. Introduction

In the dynamic landscape of higher education, the regular revision of degree programs is crucial for ensuring quality and relevance for students. This is especially true for teacher education programs, where course designs not only serve as academic frameworks, but can turn into inspirations or blueprints for students' own future teaching. Hence, higher education courses not only equip students with content knowledge but also serve as models for effective teaching practices. Likewise, courses, their evaluations and continuous modifications can encourage student teachers' own reflective practices in their future

profession (regarding reflective practice cf. Brandenburg et al., 2017; Dewey, 1910; Farrell, 2021; 2022; Schön, 1983; Smith et al., 2017).

Within this general field, the present chapter zooms in on the TESOL program at Chemnitz University of Technology in Germany, which is devoted to developing students' competencies in Teaching English to Speakers of Other Languages (TESOL). The redesign of the TESOL courses was one essential part of the project "Pedagogical Guidance for Using Digital Feedback: Digital Feedback Map (DFM)"¹. Therein, the focus was set on the meaningful integration of digital feedback in alignment with specific learning objectives.

This chapter will describe the aims and modifications of the courses, which will be followed by a reflection on their suitability and suggestions for potential revisions or additional explorations. The courses will be presented in the sequential order of the degree program by placing special emphasis on the implementation and evaluation of the courses in the Master program. By contrast, the realization of the Bachelor course was affected by short-hand changes of lecturer responsibilities and by the overall reform of the degree programs. The next section will therefore provide information on the program reform before the modified courses will be described in more detail.










2. Reform of the Degree Programs

Regular revisions of degree programs are an essential mechanism for quality assurance in higher education. They are often driven by societal changes and economic needs, such as the anticipated job profiles of the graduates. Over the past years, evaluation surveys among students indicated a desire for a greater practical orientation of the courses to which several staff members have responded by modifying their teaching approaches. However, the official module descriptions still had a strong theoretical focus and therefore required revision. In addition, two new professors (TESOL and Linguistics) had joined the English department at Chemnitz University of Technology (TU Chemnitz) in the meantime. They place a strong focus on digital approaches, which resonates with current needs and graduate profiles. In a two-year long process (from 2021 to 2023), the Bachelor and Master programs of the English department were therefore revised thoroughly. The reformed programs for "English Studies" passed the university's official accreditation procedure in 2023 so that the new regulations took effect from winter term 2023/24 onwards.

Figure 1 and Figure 2 provide an overview of the old and new courses that are coordinated by the TESOL section at TU Chemnitz.

1 Funding for the project "Didaktische Orientierung für digitales Feedback (Pedagogical Guidance for Using Digital Feedback): Digital Feedback Map (DFM)" was provided by the *Stiftung Innovation in der Hochschullehre* (ID: FRFMM-181/2022, project duration 09/2022-11/2023).

Figure 1: Overview of Old BA and MA Courses (Winter Term 2020/21 until Summer Term 2023)

Overview of old courses			
		BA Courses	
Academic Study Skills 			Second Language Acquisition 
		MA Courses	
Introduction to English Language Teaching 	Methodology of Adult Education 	E-Learning 	
Curriculum Planning & Materials Development 	Classroom Observation & Teaching Practice 	TESOL Research Colloquium & Master Project 	

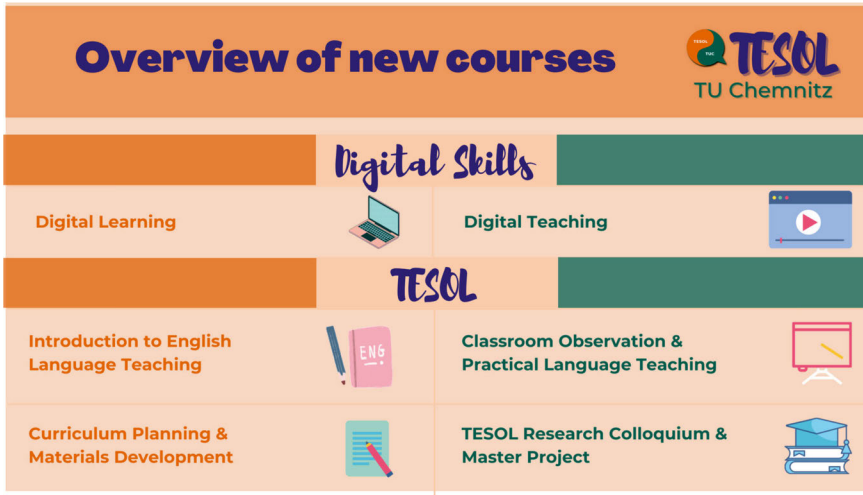
As shown in Figure 1, the TESOL section had previously coordinated two Bachelor courses and six Master courses. In the old regulations, the course “Introduction to English Language Teaching” was officially named “Intercultural Second Language Acquisition Theory”, which, however, did not resonate with students’ need for a greater practical orientation. Moreover, the official term caused confusion among the students, as the BA course “Second Language Acquisition” was named in a similar way.

Moreover, it should be noted that the “TESOL Research Colloquium” was not yet part of the official program documents even though most students choose TESOL as the focus of their Master thesis. This circumstance was caused by the lack of a TESOL professorship until 2020. When I took over this professorship, it was eventually possible to offer this much-needed colloquium.

Furthermore, with societal changes, notably the increasing need for schoolteachers in Germany, the official title of the course “Methodology of Adult Education” turned out to be too restrictive. In addition, a stronger focus on digital teaching skills was deemed necessary, not the least due to the popularity of online teaching as well as hybrid and blended learning since the Covid-19 pandemic. Since 2021, it was therefore executed as a methodology course in which students created digital materials or engaged in digital feedback processes.

Accordingly, several courses were renamed and restructured in the new degree programs. The responsibility of the “Academic Skills” module was shifted to the practical language program and anchored in both the BA and MA programs. It thus no longer appears in the overview depicted in Figure 2.

Figure 2: Overview of New MA Courses (from Winter Term 2023/24 onwards)



As can be seen, the six courses from the Master program have been clustered into two modules, “Digital Skills” and “TESOL”. The “E-Learning” course has been renamed into “Digital Learning” to achieve greater consistency within the module. It also contains the new “Digital Teaching” course that builds on the reformed “Methodology” seminar. The “TESOL” courses finally carry the more fitting names, including the new “TESOL Research Colloquium”.

Students will attend these seminars in the following order: In the first Master semester, they take the introductory courses on “English Language Teaching” and “Digital Learning”. In the second semester, they will practically apply the knowledge within the protected space of the seminars on “Curriculum Planning & Materials Development” and “Digital Teaching”. Afterwards, the students will complete an internship at an external institution, e.g. a school or language institute. This internship will be accompanied by the seminar on “Classroom Observation and Practical Language Teaching”. Finally, in the fourth semester, the students will draft their Master thesis and attend the “TESOL Research Colloquium”. In all these seminars, (digital) feedback will be utilized by the teacher and students to support their learning journey.

This reform of the degree programs mainly occurred when the DFM project was conducted. Consequently, the new seminars can directly benefit from the insights gained during the project, but they might also inspire improvements in additional courses. The changes will therefore be unveiled in the next sections.

3. Course “Study Skills”

The “Study Skills” course was offered to first-semester Bachelor’s students enrolled in *English & American Studies* at Chemnitz University of Technology until winter term 2022/23, i.e. before the new degree program for *English Studies* set in. Due to unforeseen and short-dated changes in teaching responsibilities a few days before the start of the lecture pe-

riod, it was not possible to implement the redesigned course as part of the DFM project. However, at that point, the course had already been crafted conceptually and will therefore be described in this section. Its effectiveness still needs to be tested, though. By contrast, all other courses sketched in sections 4 to 9 were conducted and evaluated in winter term 2022/23 and summer term 2023.

3.1. Learning Objectives

In this foundational course, students will be enabled to

- take an active and self-organized role in their studies,
- retrieve academic literature and resources effectively as well as to assess them critically,
- cite resources adequately in subject-specific citation styles,
- structure an academic paper and practice paragraph writing.

3.2. Teaching Approach and Digital Feedback Procedures

Along with the learning goals, this first-semester course for undergraduate students is divided into four sections: Orientation and Self-Organization, Literature, Citation, and Writing.

In the **Orientation and Self-Organization** section, students learn about (a) the basics of the institution, including how to access university resources and facilities, (b) principles for effective time management and independent study, (c) help-seeking and feedback use. Therein, learners will be familiarized with the contemporary conceptualization of feedback in which students play an active role. In that respect, an emphasis will be placed on digital ways of eliciting feedback and engaging with it. This will not only help them to become more comfortable with using and receiving digital feedback in their later university studies, but also to quickly establish connections with other students (peer feedback) and the instructors (teacher feedback). These procedures will be practiced in the subsequent sessions when students engage in literature searches, citation and writing activities. In previous years, students received most of their feedback in a more traditional way, i.e. from the instructor by email or face-to-face in class. Peer feedback and other forms of feedback were rare. Due to group sizes, face-to-face feedback in the classroom might not always reach every student, and shy students could be ignored because they are reluctant to openly ask their questions. Email feedback and text-editor feedback, by contrast, are limited to the written form and might not be adequate to offer emotional support and detailed explanations to the students (see the review by Schluer, 2022).

The **Literature** part starts with a library tour, where students learn how to use the library resources effectively. First, the emphasis will be placed on print resources, whereas the next session includes a workshop on using online databases and online libraries to find documents. For a selected topic, the students will retrieve resources through keywords and practice academic reading as well as the critical evaluation of literature in

sessions three and four. The fifth session covers literature management and how to use literature management tools such as Citavi and Zotero.

After these sessions, the students will upload the literature they have found into Zotero or Citavi, categorize it and export the file in bib format for easier compatibility with other reference management systems. Subsequently, they will select one journal article, read it, summarize it and evaluate it critically with the help of guiding questions on a worksheet. Students will be asked to upload the files onto the course cloud, after which they will receive a short screencast feedback file from their instructor. In the screencast, the instructor can pinpoint the strengths of the submitted assignment, demonstrate corrections and offer additional tips for a more effective use.

This links up to the **Citation** section. Different citation styles will be introduced and accompanied by practical activities. Students will practice the use of in-text citations and the formatting of reference entries for the bibliography by utilizing APA (American Psychological Association) and MLA (Modern Language Association) citation styles.

This leads smoothly to the **Writing** part of the seminar. The students are introduced to academic writing, characteristics of academic language and common paper structures. For a topic of their choice (or a given topic), they will engage in academic writing activities and learn how to formulate a research question. They will share their mini essay or proposal on the course cloud, together with appropriate citation. With the help of the text-editing and commenting features of the cloud application, the students will engage in a peer feedback activity by providing feedback to a fellow student's assignment. Afterwards, the instructor will give feedback via the cloud-editor as well as during a subsequent videoconference. The videoconference allows the direct navigation through the documents to identify common challenges and interactively discuss open questions with the students. Finally, the last class is a Q&A session in preparation for the exam, which is a take-away test that needs to be completed within a given time limit.

Overall, then, there are three types of digital feedback involved in the design of this course, namely screencast feedback from the instructor, cloud-editor feedback from peers and the instructor, and subsequent videoconference feedback.

4. Course "Introduction to English Language Teaching"

The "Introduction to English Language Teaching" is the first-semester course in the TESOL module.

4.1. Learning Objectives

In this introductory course, the first-semester MA students gain a comprehensive overview of the broad field of English language teaching. The aim is to lay important theoretical and practical foundations for the subsequent TESOL courses and for their future profession. This includes students' ability to

- describe, explain and critically discuss the leading models, methods and principles of foreign language learning and teaching,

- describe important principles for the teaching of grammar, vocabulary and culture as well as the skills of reading, writing, listening, speaking and mediation,
- suggest practical teaching activities based on theoretical knowledge and contemporary perspectives on language learning and teaching in face-to-face and digital environments.

4.2. Teaching Approach and Digital Feedback Procedures

The seminar follows an inverted classroom approach (Lage et al., 2000), i.e. knowledge acquisition is accomplished through preparatory reading of a relevant textbook chapter (taken from Meyer et al., 2022), videos or other web resources, whereas the seminar sessions are dedicated to the clarification of open questions and the application of the knowledge gained.

In previous years, the students completed a series of tasks, such as filling out a self-reflective questionnaire at the beginning of the course (EPOSTL; Newby et al., 2007), drafting student activities or engaging in group discussions. Nevertheless, compared to other courses, there was relatively little interaction among the students and with the teacher. This might have been due to the theoretical orientation of the seminar or due to the teaching methodology that was adopted. Moreover, it was observed that the number of questions about the exam contents increased towards the end of the seminar, whereas hardly any questions were posed in earlier sessions. Additional possibilities for student activation were therefore considered for the redesign of this course.

Notably, collaborative feedback on Padlet, a cloud application that resembles a digital bulletin board, was utilized. For three seminar topics, the students were asked to post their ideas and assignment solutions on a Padlet. Each student then viewed their fellow students' posts, liked them, commented on them, re-structured them, or linked them to related posts. Moreover, beyond text comments, they could also create audio or screencast feedback on Padlet (see Schluer, 2022, pp. 102–103, and chapter 8 by Gießler and Olejniczak in this volume). Digital feedback processes can thus take place in various ways. One seminar topic that was deemed particularly suitable was intercultural learning and teaching. For this topic, students linked online resources on the Padlet and commented whether and why they considered them useful or not. The digital board therefore provided a space for critical reflection and discussion.

Another significant change in the seminar was the introduction of peer quizzing (cf. Mazur, 2013) and the incorporation of continuous self-assessment of one's own level of knowledge throughout the seminar. By contrast, in previous years, only a comprehensive checklist about the course contents was disseminated in mid-term and a mock exam was conducted in the week before the final exam. As part of the DFM project, students were actively involved in the development of quiz questions. After the first theoretical units (chapters 1 to 4 of the textbook by Meyer et al., 2022), the students worked in small groups to generate two to three questions per chapter, along with the correct answer or answer options. Each small group focused on one chapter. They were free to choose the question format (open or closed question, such as single choice or multiple choice) as well as the survey mode/tool (e.g., textpad or polling feature of the video conferencing application BigBlueButton or an external tool such as Mentimeter, Particify, Pingo, Bamboo-

zle). Then they posed these questions to their peers and discussed the answers. This activity served four major purposes: They needed to ensure their own understanding of the topic by closely reading the pertinent chapter as a preparation for the session; otherwise, question creation would be difficult. Second, they did not only learn about assessment and testing through the textbook, but practically applied and refined their testing skills through this activity. Especially when the peers gave an unexpected response, a critical reflection on the formulation of their question and the choice of the response type or answer options was triggered. Third, as respondents, they were able to test their own knowledge and understanding. At the same time, the lecturer gained insights into students' progress and level of understanding. Fourth, a pool of questions was beginning to be generated that can be re-utilized by the current students for their exam preparation or by prospective course participants for self-assessment purposes.

Additional changes were as follows: In foregoing years, modified questions from the "European Portfolio for Student Teachers of Languages" (EPOSTL; Newby et al., 2007) were used at the beginning of the seminar to encourage self-reflection among the prospective teachers. When students aspire to a teaching career, continuous feedback is important so that they can tailor their teaching to the needs of their learners in specific learning situations. For this purpose, not only feedback from learners to teachers is important, but also self-feedback, e.g. based on teaching experiences. Different e-portfolio tools were therefore inspected. It became apparent that the tools were either platform-bound (e.g. learning platform OPAL), that their range of functions was limited, that a seamless integration into an existing learning platform was not possible (Portfolium), or that there were access restrictions (Moodle/Mahara), additional costs (Adobe Portfolio) or concerns about data protection (Google Sites). It was thus decided to generate a PDF form for the EPOSTL assignment, which could be uploaded to a teaching portfolio at a later stage.

Moreover, team skills are essential to facilitate professional growth as a teacher, which can occur through collegial collaboration and peer feedback. One practical task in the seminar therefore aimed to strengthen the collaborative skills of the prospective teachers and simultaneously foster their digital skills on social media. Students chose one topic from the course schedule in order to identify the key information and convey it in an attractive manner to fellow students and the broader TESOL community. More precisely, the prospective teachers were requested to design an Instagram post (as a series of images) or a reel, which would eventually be uploaded onto the TESOL.TUC Instagram channel (<https://www.instagram.com/tesol.tuc/>). When conducted as group work, this activity requires team-internal coordination (intra-group feedback; see Schluer, 2022, p. 111). Additionally, team-external feedback from other course members or the wider Instagram community was enabled through such a public post. However, since not all course members have an Instagram account or want to use it for university purposes, these feedback procedures could become more difficult. For further recommendations regarding the use of social media for feedback purposes, see chapter 12 by Schluer in this volume.

Finally, at the end of the course, students were asked to complete an online course evaluation questionnaire. In contrast to previous years, it contained an additional sec-

tion about digital feedback procedures. Overall, it served as a source of summative feedback from the students to the lecturer at the conclusion of the course.

4.3. Proposed Changes for Subsequent Implementations

For future implementations, it is planned to continuously expand the database of questions by involving the students actively in the development process. Afterwards, this growing pool of questions will be transformed into self-assessment quizzes that students can use as a preparation for the final exam. Especially in courses that do not comprise an exam (such as the reformed course in the new degree program), the questions could (additionally) be utilized as part of the preparatory work for the individual sessions. In other words, after students have read the relevant chapter for a session, they should take the online quiz and pass it with at least 60%, for instance (multiple tries might be allowed). Teachers could determine an overall number of quizzes that need to be passed before course closure, e.g. 8 out of 10 mini quizzes need to have a pass rate of at least 60%. If the module regulations do not require a pass for that course, some of the questions might be implemented during the course sessions via audience response systems (ARS; see literature review and suggestions by Schluer, 2022, pp. 156–163).

Zooming in on one assignment, i.e. the social media task, teachers might consider utilizing fake messengers as an alternative to real messengers to develop students' digital feedback skills on social media channels within a protected space.

Zooming out to the entire degree program, the EPOSTL assignment could be conceived of as the first component of an e-portfolio that the (prospective) teachers will continue to complete during their studies and professional career. For this, an e-learning application needs to be chosen that can also be accessed across modules and after graduation (cf. Winchell, 2018). It should be utilized for self-reflection and could also incorporate feedback from peers, lecturers, mentors and colleagues at schools etc. (cf. Schluer, 2022, pp. 222–224).

5. Course “Methodology of Adult Education: Digital Feedback Methods”

The course is conducted in the second semester of the MA program. In the old degree regulations, it was part of the TESOL module, whereas it evolved into a mandatory course for students of all specializations with the introduction of the new *English Studies* degree program (see section 2). The present section will concentrate on the “Digital Feedback” course which was part of the TESOL module element “Methodology of Adult Education”, whereas section 6 will be devoted to the new “Digital Teaching” course of the “Digital Skills” module.

5.1. Learning Objectives

Until summer term 2022, the course objectives were as follows: By the end of the course, students should be able to

- describe important characteristics of feedback,
- distinguish between different digital feedback methods,
- use digital applications to test learners' knowledge,
- produce a screencast video for feedback purposes.

Due to the expanded focus in summer term 2023, a modification of some aims became necessary. Students should be enabled to

- describe important characteristics of feedback,
- distinguish between different digital feedback methods,
- produce digital feedback by applying assessment criteria and utilizing digital tools,
- critically assess the produced feedback and reflect on potential improvements,
- create and present a task description for the purposeful integration of digital feedback in teaching.

5.2. Teaching Approach and Digital Feedback Procedures

This second-semester course adopts project-oriented learning as a methodological approach, i.e. students work on a practical project throughout most seminar sessions.

According to the old study regulations, this course was called “Methodology of Adult Education”, which, however, did not align with the broad fields of interest and needs of students aspiring to a teaching profession in primary and secondary education, as well as in higher education or university-external adult education contexts (due to a shortage of teachers in Saxony and throughout Germany).

Since winter term 2018/19, the focus of the course continued to evolve over the years; however, the common element of all implementations was the focus on pedagogically-driven technological competencies (see e.g. the TPACK model by Koehler et al., 2013). Until summer term 2022, the participating students created **peer screencast feedback** and thus developed feedback skills, academic skills and video production skills in an integrated manner (see Schluer, 2020, for details). Online questionnaires were used after each step of this complex process, through which students were encouraged to self-reflect while the teacher gained insights into the participants' understanding and progress.

The approach was refined over the years. First, live poll feedback (in Pingo) was added, which students created in small groups and utilized during their short presentations. Their task was to design an interactive presentation on a theoretical or empirical article on feedback by engaging their peers via Audience Response Systems (ARS). For this, they were provided with a tutorial video that demonstrated the functions of the ARS Pingo (Schluer, 2021, available at <https://youtu.be/JqImJfW4jVo>; short link: <https://tinyurl.com/JSchluerPingo>).

Next, the practical phase started in which the participating students exchanged their own academic text drafts and provided electronic feedback in the text editor and via screencasting. The peer feedback in the text editor as well as in the screencast was implemented anonymously to produce feedback independent of interpersonal relations between the peers. Since many reviewing functions of the text editor as well as the creation of screencast feedback were novel for the participating students, the entire process was

facilitated by the teacher through demonstrations, manuals and one-on-one coaching (see Schluer, 2020). Regular mini consultations were conducted via videoconferences in which students shared their screen and addressed their progress and questions. During these one-on-one consultations, the instructor provided individualized feedback to assist the students in producing their text-editor-based screencast feedback video. After the mini consultations, the instructor summarized the most frequently recurring challenges that the students encountered and offered solutions through demonstrations via screensharing. Moreover, an online forum was set up for students' questions, and tutorial support was additionally provided.

The anonymous scenario, however, makes dialogic feedback processes difficult to accomplish. Even though the students had the chance to clarify open questions with their peers after they had received the anonymous feedback files (reviewed text document and screencast video), only a limited number of students engaged in follow-up dialogues with their peers. This could have had several reasons: either the feedback was entirely clear for them, or they did not see any urgency to continue their work on the reviewed draft, or they did not want to reveal their identity to their peers.

To encourage interactions – even in anonymous settings – two further novelties were introduced in summer term 2022, namely a “Feedback Request” and a “Feedback Response” sheet (cf. Winstone & Carless, 2020, pp. 108, 110; see also Schluer, 2022, pp. 37, 42–43). In the feedback request, the students were encouraged to reflect on the strengths and weaknesses of their own draft text and to identify up to three areas on which they would like to obtain feedback (assessment criteria). The questions were as follows:

- (1) What do you think are the **strongest aspects** of your assignment? OR: What are the areas you feel confident about in your assignment?
- (2) What areas of your assignment do you think **need to be improved**? OR: What are the areas you are unsure of in your assignment?
- (3) I would particularly like to **get feedback on** (list up to three specific areas): ...

This self-reflection can prompt students to self-correct even before submitting their assignment. However, since prospective teachers are expected to develop diagnostic skills for assessing the quality of their peers' submitted drafts, the self-assessment (the feedback request) was not shared with the peers, but only the draft. In a real class context, however, this feedback request would be submitted along with the draft text, e.g. as a cover sheet (Winstone & Carless, 2020, pp. 108, 110).

After the peer feedback was produced, the prospective teachers were encouraged to self-reflect on it. Likewise, after they had obtained feedback, they assessed the peer feedback by completing an online questionnaire. Additionally, they were asked to revisit their initial feedback request and compare it to the feedback they had received. In this feedback response sheet, they were also encouraged to set up an action plan. More precisely, the instructions were as follows:

- (1) These are the **key points** that I remember from the feedback that I received: ...
- (2) In how far does peer's feedback **match** your own evaluation and feedback request?
- (3) Are there any **additional points** you were not aware of beforehand?

- (4) Was there something in the feedback that you found **unnecessary**? Why?
- (5) In how far does the feedback **help you to improve** your further learning? What **steps** do you want to take now? Set up an **action plan** for your further learning based on the feedback you have received and your own reflections.

The different data sources (teacher and peer assessment of the feedback generated) formed the basis for the final feedback discussion with each student. This feedback on the feedback dialogue was done in a videoconference due to the pandemic restrictions, but could alternatively be held in the classroom. In addition, the students provided feedback to the instructor via a digital course evaluation survey. After five courses on peer screencast feedback that were continuously refined, the results show that the course design has reached a level of maturity which does not require any serious restructuring. Optional modifications only refer to the use of alternative programs for screencast creation. Up to now, the very comprehensive and yet easy-to-use video editor Camtasia had been used. However, since 2023 the free version was only available for a three-day use instead of a 30-day trial. Alternative freeware programs could therefore be tested.

Indeed, since the Covid-19 pandemic, additional functions for existing digital apps as well as several new digital tools were developed. At the same time, also other digital feedback methods gained in popularity. In summer 2023, the thematic spectrum of the course was therefore broadened, i.e. students were able to define their own focus for their project in the area of digital feedback. Moreover, it was possible to draw on the newly published textbook *Digital Feedback Methods* (Schluer, 2022) to help students gain an overview of feedback methods beyond screencasts, text editors, live polls, video conferences, and surveys. At the same time, this textbook revealed underexplored areas, which were tackled in the DFM project. Furthermore, advances in AI led to a boost in new tools and functions that still need to be tested in terms of their usefulness for feedback purposes (see closing chapters 16 and 17 by Schluer in this volume). The scope of the textbook (Schluer, 2022) was therefore expanded, with the seminar being conducted as part of the DFM project (see introductory chapter 1 by Schluer in this volume).

The general course structure, however, was similar to the previous screencast feedback project. The seminar started with theoretical foundations in which the students teamed up to prepare a short presentation with interactive elements (poll feedback). They mainly dealt with recent literature, studies and models about feedback literacy, which pertained to the following topics:

- (1) The importance of feedback for learning success (Hattie & Timperley, 2007; Wisniewski et al., 2020),
- (2) Feedback ecology and feedback as sociomaterial practice (Chong, 2022; Gravett, 2022),
- (3) Student feedback literacy (Carless & Boud, 2018; Zhan, 2022),
- (4) Peer feedback training and practice (Sun & Doman, 2018; Wood, 2022),
- (5) Teacher feedback literacy and feedback opportunities in course design (Esterhazy, 2019; Boud & Dawson, 2023).

Afterwards, the main project phase started. Each student was asked to think of a specific learning context and task as well as to select a suitable digital feedback method and tool. In the end, the students chose one of the following methods: blog feedback, chat feedback, digital board feedback, e-mail feedback, e-portfolio feedback, robot-assisted feedback, survey feedback, wiki feedback.

For their chosen feedback method and tool, they created a written task description as well as a video tutorial. Similar to the screencast feedback course, regular feedback consultations were incorporated into the seminar sessions, either in videoconferences or in the physical classroom. Moreover, tutorial support was provided. Overall, the students completed the following steps:

- designing a task for a specific learning environment,
- presenting and discussing the ideas,
- piloting the task,
- creating a written manual (by completing a task template),
- producing a video tutorial,
- reflecting on the process and learning gain.

Finally, the eight task manuals and video tutorials were incorporated into the “Digital Feedback Map” (Schluer, 2023a; available at <https://tinyurl.com/DigitalFeedbackOverview>). This new course closed with an evaluation survey to elicit student opinions about potential improvements.

5.3. Proposed Changes for Subsequent Implementations

The contents of the course and its procedures underwent continuous modification by responding to students’ needs (e.g. from previous course evaluations) and new developments in the field. With the heightened relevance of digital teaching, the degree programs were reformed so that the methodology seminar turned into an obligatory course for all students of English Studies at TU Chemnitz. Its design will be described in the next section.

6. Course “Digital Teaching”

The seminars “Digital Learning” and “Digital Teaching” are part of the newly introduced module “Digital Skills”, which was implemented in the academic year 2023/24 for the first time. Thus, at the time of writing, these courses are still at a conceptual stage. However, in terms of the teaching approach, the “Digital Teaching” course will thrive on the experiences gained from the former TESOL “Methodology” seminar. Moreover, in terms of contents, it builds on the “Digital Learning” course that is currently being conducted. Therein, students learn about current reference frameworks and instruments that help them assess and develop their digital skills. They deal with relevant theories in the field of e-learning as well as media literacy and apply them in the criteria-based manner through SWOT analyses of digital applications and resources (see e.g. Farrokhnia et al., 2023, with

regard to ChatGPT). In this way, they gain a deeper understanding of digital learning media and methods, which they apply in the follow-up seminar from a teacher's perspective.

Overall, the contents of the module aim to support students (and prospective teachers) in adopting and enacting a reflective and critical approach to digital media. The precise learning objectives of the "Digital Teaching" course will be outlined next.

6.1. Learning Objectives

In the course, students develop strategies for selecting, designing and using digital resources in a pedagogically appropriate way, i.e. based on the intended learning objectives and learner needs. In particular, the seminar seeks to foster students' digital communication and collaboration skills as well as their ability to create digital teaching materials. In that regard, they carry out a practical multimedia project in which they design digital materials collaboratively and independently. The concrete content of the seminar and of the multimedia project will vary with recent developments in the field of digital teaching, while taking into account relevant findings and theories on multimedia learning. By the end of the course, the students should thus be able to

- describe and critically assess existing models of digital pedagogy by focussing on a meaningful integration of digital tools in teaching,
- produce an educational video and design engaging learning activities collaboratively and independently by applying principles of socio-constructivism and multimedia learning,
- make constructive use of AI tools for (self-)feedback,
- exchange digital peer feedback on the drafts of their video as well as learning activities and test the materials with a peer group,
- present their final multimedia project and critically reflect on it in the module paper by drawing on the contents from both courses (Digital Learning & Digital Teaching), the feedback they have received as well as relevant theoretical and methodological literature.

6.2. Teaching Approach and Digital Feedback Procedures

In the first sessions of the seminar, the students will explore relevant frameworks and approaches of digital teaching. Together with 2 to 3 peers, they will critically engage with relevant literature (1 or 2 articles), prepare a **short interactive presentation** (including live polls) and discuss the contents interactively with their fellow students. Based on that, they will gain a comparative understanding of different frameworks and models and identify key principles for digital pedagogical design. In this phase, they will also negotiate principles for effective team work to optimize their collaboration. Moreover, they will agree on relevant criteria for peer feedback and apply them to their peers' presentations. This way, important foundations will be laid for digital peer feedback processes during the creation of their multimedia projects.

Students will be offered a list of possible topics from the field of digital pedagogy, but will also be allowed to add their own topic suggestions and work on them. As a first step,

they will be asked to create a short **instructional video** about their chosen topic within their team. This includes the phases of pre-production (planning), production (video creation), and post-production (editing). Drawing on relevant literature and sample videos, the students will learn about design principles of instructional videos and set up criteria for their evaluation. The groups will share their video drafts on a video platform, which will be commented on constructively by another team. Based on the feedback, they will write action plans for revising their instructional video.

Afterwards, the second phase of the multimedia project will begin. As instructional videos often suffer from a lack of interactivity, their task will be to design **engaging learning activities** that accompany their video. To build a relevant theoretical understanding, the students will consider behavioral, cognitive, and affective dimensions of learner engagement and apply them to their project. They will determine specific learning goals, incorporate digital formative (ongoing feedback) and summative assessment (testing on the educational content that has been presented), and select suitable digital tools for their tasks. Moreover, they will conduct a mini digital teaching session (micro-teaching) and critically reflect on the effectiveness of their teaching project. Additionally, the usefulness of AI tools for feedback on their materials design will be tested and evaluated by the students.

Thus, overall, the students will provide and receive feedback at several stages of project development (formative assessment). For this, specific sessions and activities have been scheduled in which the students are trained in feedback provision and equipped with guidelines for self- and peer assessment, together with ongoing coaching and feedback by the teacher. Finally, an end-of-course survey will be implemented to improve the planning of the course contents for the future. Furthermore, a general wrap-up and reflection will be conducted in the final session.

While the overall project and the video are collaborative work, the students coordinate the creation of the learning activities and extra materials (e.g. handouts, tasks, podcasts, social media posts) among the individual team members. Each group member should produce at least one of these extra materials on their own. The reflection on this independently produced material will be one important part of the final paper. This overall procedure of collaborative and independent materials development evolved from the TESOL course “Curriculum Planning & Materials Development”, which will be described next.

7. Course “Curriculum Planning & Materials Development”

Until 2023, this seminar was held in parallel to the course “Classroom Observation & Practical Language Teaching” in the third Master semester. However, with the new degree program, it was shifted to the second semester, i.e. finalized before the students conduct their internship and attend the “Classroom Observation & Practical Language Teaching” course in their third semester (see section 8 below). While the author of this chapter has designed all TESOL courses, the “Curriculum Planning & Materials Development” course was held and refined by Yarong Liu during the project period (i.e. in winter term 2022/23 and 2023/24). The present section will outline the essential course proce-

dures, whereas details about the implementation can be gained from the chapter by Liu in this volume (chapter 3).

7.1. Learning Objectives

By the end of the course, students should be able to

- describe relevant principles and criteria of curriculum planning and materials development,
- develop learning and teaching materials as well as lesson plans for different purposes, learner groups and settings (face-to-face, blended learning, hybrid and online teaching),
- critically reflect on the plans and materials they have created,
- suggest adaptations of their learning and teaching materials for differentiated instruction (proficiency levels, linguistic and cultural heterogeneity etc.).

7.2. Teaching Approach and Digital Feedback Procedures

This course follows a problem-based or problem-oriented learning approach to practice and promote problem-solving skills for basic challenges in everyday teaching (cf. Sonntag et al., 2017, p. 46). Accordingly, several real-world (and annually changing) case scenarios were developed for which TESOL students create customized teaching and learning materials that they could implement, evaluate, and modify either during their internship or in their future careers. Within a small group of 3 to 4 persons, the students select a scenario and develop an overall course plan as well as an exemplary lesson plan in a collaborative, problem- and practice-oriented manner. In addition, each group member individually develops a concrete task and suitable materials for another session from the overall course plan. The students give a regular report on their progress and receive feedback from their peers and the instructor. Each student finally assembles relevant materials in an e-portfolio and reflects on them by resorting to theoretical and methodological literature. This seminar also functions as a bridge between the theoretical and methodological knowledge acquired in the introductory seminar (section 4) and the practical experience to be gained during the internship (see section 8).

In earlier implementations, it was mainly the instructor who provided feedback to the groups and individual students. Regular meetings in break-out rooms were scheduled for this. In the redesigned course, a greater variety of feedback activities was incorporated. The activities considered several feedback methods, tools, directions, and timing options and were aligned with specific learning contents. The feedback methods included feedback in cloud editors, forum feedback, and poll feedback by using a variety of digital tools, such as Google Docs, Google Forms, Mentimeter, Padlet, and Wakelet. They were aligned with specific learning objectives, as explained by Liu (chapter 3 in this volume). Importantly, the course not only utilized digital feedback methods, but its main aim was to empower students to incorporate digital feedback into the courses and the lesson materials they designed, i.e. to foster prospective teachers' feedback literacy (cf. Boud & Dawson, 2023; Carless & Winstone, 2023).

Based on the findings from the initial test run in winter term 2022/23 (see chapter 3 by Liu), the course has been modified further for its second implementation in winter term 2023/24. Moreover, keeping pace with theoretical advancements in teacher feedback literacy (Schluer et al., 2023; Tai et al., 2023), the modified course thrives from a joint design in which the feedback activities are co-designed with the participating students (see Liu in chapter 3). Accordingly, the course schedule only contains preliminary plans that can be modified according to students' needs. Thus, starting from session 3, the instructor encourages discussions among the students to make decisions on suitable methods and tools for the next feedback activity. This procedure is meant to heighten the participants' active engagement in the feedback process as well as to model the kinds of negotiations that they could conduct with learners in their own classrooms (cf. Liu in chapter 3). Likewise, there will be moderated discussions after the students engaged in peer feedback activities. This is meant to increase students' reflective thinking, enhance their critical judgment about the clarity of the feedback contents as well as the suitability of the chosen digital tools. In that respect, the topic of critical digital literacy (Dooly & Darwin, 2022) has been added to the course plan and students will be asked to connect their practical experiences gained in a social media feedback activity to relevant theories. These regular reflections should assist the prospective teachers in developing their feedback literacy as well as those of their future students. They resonate with the concept of teachers as reflective practitioners (Dewey, 1910; Schön, 1983), which will be fostered further in the subsequent course, i.e. "Classroom Observation and Practical Language Teaching" (see below).

7.3. Proposed Changes for Subsequent Implementations

As the revised implementation is still ongoing at the time of writing this chapter, no specific suggestions for further modifications can currently be made. The important point, however, is that teachers should reflect on their teaching regularly, do research on novel implementations, and be open-minded as well as critical towards new developments. Some innovations can indeed boost students' learning, others need to be discarded when they turn out to be ineffective or unsuitable. Flexibility on the part of the teachers and openness towards students' voices appears to be crucial to design courses that meet the needs of specific learner groups. The co-design approach that has been suggested here seems to be promising to advance learning.

8. Course "Classroom Observation & Practical Language Teaching"

Prior to the Covid-19 pandemic, small groups of students observed lessons in different educational institutions. Due to the pandemic lockdown, such a procedure was no longer possible. Moreover, more extensive practical experience and methodological reflections were considered important to help students grow into their prospective role as teachers. The course had therefore been entirely redesigned and structured around three themes:

- (1) Classroom Observation,
- (2) (Micro-) Teaching,
- (3) Reflective Practice.

In line with that, three pillars of the internships were defined:

- (1) Classroom observation,
- (2) Own teaching or support of other teachers,
- (3) Further job-related tasks (e.g. creating educational videos about foreign language learning, advertising courses via social media, creating extra materials for the learners, evaluating existing courses).

8.1. Learning Objectives

The above-mentioned structure aimed to foster students' abilities to

- write a classroom observation protocol and critically discuss their observations,
- analyze teaching practices and reflect on their own teaching experiences,
- suggest potential modifications for their future teaching based on contemporary teaching methods, models, and principles.

8.2. Teaching Approach and Digital Feedback Procedures

Overall, the concept of reflective practice is fundamental to this course, as it is essential for the continuous professional development of teachers (Dewey, 1910; Farrell, 2022; Schön, 1983). Students' classroom observations and teaching practices during their internships are therefore accompanied by this seminar that helps them to prepare, analyze and evaluate the internship sessions that they have observed and taught. This includes the use of observation instruments as well as of analytical tools and approaches that encourage reflection and continuous improvement of their own teaching practices.

In part 1 of the seminar, students compare different classroom observation protocols and discuss suitable techniques for distinct observation purposes. Since the observation contexts will vary from internship to internship, a first draft of a comprehensive classroom observation form was created by the instructor (revised version available at <https://tinyurl.com/ObservationFormJSchluer>). This classroom observation form is not only digital in nature (a cloud-based online survey), but also considers numerous aspects of digital and hybrid teaching which had hardly been considered in previously published lesson observation protocols. Due to its novelty, the observation sheet was designed as open-ended, i.e. the students were asked to critically review it, add additional aspects, or modify existing ones. In this way, the lecturer received feedback on the draft she had designed. Special attention was paid to the use of digital feedback by the observed teachers and learners, as this had not been captured by existing classroom observation forms. For this purpose, the students were provided with a first draft of the "Digital Feedback Map", which contained a rough overview of different digital feedback methods at that

stage (now finalized as Schluer, 2023a, and available at <https://tinyurl.com/DigitalFeedbackOverview>). After each student had given feedback on the draft of the digital observation form, they were asked to provide feedback on their peers' comments. Based on that, the lecturer revised the classroom observation form so that students were able to use it in the subsequent sessions and during their internship or even during their later teaching profession.

The two sessions which were needed to develop the digital classroom observation form in 2022 were replaced by practical observation activities in 2023. In the first observation practice, the students watched a video-taped EFL session (Roberts, 2016) and paid close attention to one particular aspect, in this case instruction-giving. In contrast to this on-site course, the next observation practice was about an online session conducted via Zoom (Bollas, 2020). Here, the focus was set on interaction patterns in the online classroom. For each observation practice, students obtained guiding questions and were able to consult relevant sections of the comprehensive classroom observation form (<https://tinyurl.com/ObservationFormJSchluer>).

These analyses of video-taped lessons constituted a first important step to deepen their understanding about "reflective practice" (Farrell, 2022; Schön, 1983). Students were familiarized with the concept of a reflective practitioner and enacted this after their own micro-teaching. In the old degree program, the micro-teaching was an optional assignment due to the limited number of credit points that can be obtained for that seminar. From winter term 2024/25 onwards, however, it will turn into an obligatory element. Nevertheless, several students already seized the micro-teaching opportunity in earlier years to obtain feedback on their teaching and task ideas. So far, the micro-teaching was either done in a videoconference or in a hybrid manner. Subsequently, the students were guided to self-reflect on their performance. Moreover, they obtained feedback from their peers and the instructor.

Finally, in the internship report, the students were required to closely analyze a taught or observed session and reflect on it by drawing on relevant literature and their own experience.

8.3. Proposed Changes for Subsequent Implementations

Ideally, the completed lesson observation forms will be integrated into the students' personal e-portfolios so that they can also observe and reflect on their own development in the long term. A first foundation for this has been laid through the EPOSTL assignment in the introductory course (see section 4). In addition to self-feedback, e-portfolios enable various forms of feedback from teachers, mentors, employers, colleagues and student peers. Such an approach could be facilitated through multidirectional mentoring between teacher candidates and experienced teachers at schools, universities and further educational institutions.

Another option is to have students keep a "Digital Internship Diary" (cf. Chong, 2022, p. 8: "asking teachers and learners to complete reflective diaries, feedback logs, or record reflective videos"). A blog application would be suitable for this purpose, but for privacy reasons, it should preferably be accessible by course members only or privately. Selected contents from this blog could then be shared with fellow students (peers) to give and

receive blog feedback (Schluer, 2022, pp. 116–123). The “Digital Internship Diary” might serve as a supplement to the digital classroom observation sheet.

9. Course “TESOL Research Colloquium”

The TESOL Research Colloquium (TRC) is the course that has undergone most change during the digital feedback project and has also been researched most extensively (see Schluer, in prep.; Schluer, submitted). The present section describes the changes in the teaching approach and further modifications that are planned for future implementations.

9.1. Learning Objectives

By the end of the course, students should be able to

- delimit a research topic and specify the research question(s) for their thesis,
- describe different research methods and select those that fit the research goals,
- sketch a research design and timeline for their research project,
- analyze empirical data, also by using specialized software for quantitative and qualitative analysis,
- present their research project ideas and/ or thesis in written, oral and multimodal ways,
- provide feedback to their fellow students by using various (digital) feedback methods and engage in critical discussions.

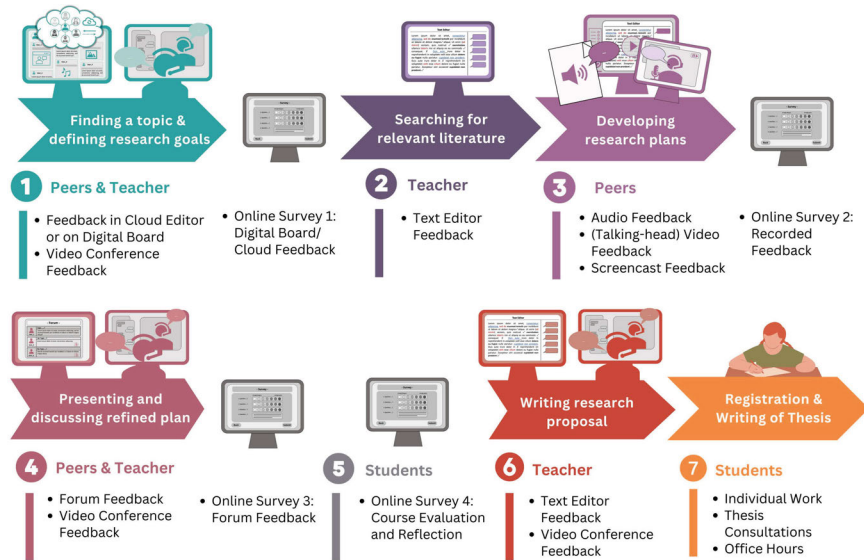
9.2. Teaching Approach and Digital Feedback Procedures

Previously, there was only one opportunity for each student to obtain feedback on their research plans. In line with the requirements of the old degree programs, students reported about their research process in one of the course sessions, which was followed by peer and instructor feedback. As the first research colloquium took place in the first semester of the Covid-19 restrictions, students did not give a live presentation, but screenrecorded it before a designated date. Following the inverted classroom model (Lage et al., 2000), the peers and the instructor watched the presentation and took notes before the live session. At the beginning of the webmeeting, the fellow students were requested to copy their notes into the shared notes tool of the videoconference application and discussed them orally. The presenters had the chance to clarify follow-up questions immediately, engage in further interaction with the peers, and obtain additional feedback from the instructor.

In the reformed TRC, multiple feedback opportunities are granted as the students move through different phases of the research process (see Schluer, 2023b, pp. 9–10). In line with the concept of “inquiry-based learning” (see the review by Pedaste et al., 2015; cf. Duran & Dökme, 2016; Sonntag et al., 2017), students both “learn to research” and “research to learn” by going through as many stages of the research cycle as possible. This

includes an introduction to the topic; the development of a research question; the collection of information about the topic, relevant theories, previous research findings, and possible methods; the subsequent selection and acquisition of methods; the development of a research design; and the implementation of the research, including the analysis and presentation of the results as well as a reflection on the entire process (Sonntag et al., 2017, p. 14). For each phase, digital feedback possibilities are incorporated, as shown in Figure 3 (expanded version from Schluer, 2023b, p. 9).

Figure 3: Feedback Procedures in the Revised TESOL Research Colloquium



All this takes place within an open learning and feedback environment (cf. Sonntag et al., 2017, p. 39; Wood, 2019). Thus, to enable sustained support and learning from and with one another in this complex process, the participants continuously share their progress on the course cloud (or learning platform). This is followed by feedback exchanges that make use of different digital feedback methods (see Schluer, 2022). Thereby, peer feedback is typically provided before teacher feedback is given (Schluer, 2022, p. 42). Moreover, feedback is commonly exchanged asynchronously prior to a live meeting. This frees off classroom time for the clarification of recurring challenges as well as individual questions (cf. Lage et al., 2000).

Throughout this cyclical process, the teacher serves as a learning guide (cf. Vygotsky, 1978; see e.g. Duran & Dökme, 2016, p. 2891), who trains the students, monitors the peer process and provides regular feedback about the proposed contents and methods as well as about the quality of the peer comments (Schluer, 2022, pp. 40–42). Additionally, the teacher typically offers handouts with important advice, guiding questions as well as further resources and templates, depending on the students' needs (cf. Sonntag et al., 2017, p. 27).

Regular reflection and feedback loops are important elements of the inquiry cycle to enhance meta-cognition and self-regulation (see the review by Pedaste et al., 2015, pp. 55–57; cf. Marshall, 2013, cited by Gholam, 2019, p. 116). Specifically, the four online surveys depicted in Figure 3 are meant to encourage students' reflection about the affordances and limitations of the digital tools that were used for the peer feedback exchange. Such a reflection is essential to foster students' (especially prospective teachers') critical thinking as an important facet of digital competence. Upon completion of each online questionnaire, the respondents therefore received a copy of their answers, which they could collect in a kind of feedback diary or e-portfolio.

Furthermore, the surveys served as data collection instruments for evaluating the usefulness of the reformed course. However, if the participating students are already familiar with different digital feedback methods and tools, the inclusion of these surveys might be perceived as unnecessary. Thus, as soon as a degree program has been systematically redesigned with digital feedback, as suggested here, the surveys can be skipped. They should, however, be reintroduced as soon as further major modifications are made, e.g. due to technological innovations. One likely area is the incorporation of AI tools in the research and writing process, which appears to be promising, but still bears several limitations at the present stage (see chapters 16 and 17 by Schluer in this volume). To avoid misuse and erroneous output, the use of AI technologies should be critically evaluated together with the students in the classroom. This also leads us to consider some further ideas for subsequent implementations in the next section.

9.3. Proposed Changes for Subsequent Implementations

Based on the TRC research that was conducted in winter term 2022/23, i.e. the feedback analyses and the survey analyses (Schluer, in prep.; Schluer, submitted), suggestions for improvement were derived that will be incorporated in the next implementations.

Notably, it appeared that some students could have profited from further feedback training and time for practice. First of all, a systematic integration of digital feedback into the degree programs (cf. macro-level considerations by Boud & Dawson, 2023, in chapter 4 by Schluer in this volume) could help to make it a natural part of the learning process for the students, as proposed in this chapter. Since the TRC is the final course that the students attend, it will take a few years until possible effects of this ongoing training will be discerned in the TRC. However, there is a direct way in which the next group of TRC participants can already benefit from the output of the DFM project. In contrast to the TRC members from winter term 2022/23, the new participants can access detailed written manuals and video tutorials about each digital feedback method by visiting the “Digital Feedback Map” (<https://tinyurl.com/DigitalFeedbackOverview>; Schluer, 2023a).

Moreover, another change is currently being implemented: The course schedule contains a detailed reminder of feedback as a dialogic process, which is ideally initiated by the student. Thus, when submitting an assignment (e.g. on the digital board or in a text editor), the students are asked to formulate a specific feedback request (Winstone & Carless, 2020, p. 110). The aim is to support students' critical self-reflection and to reduce the amount of superficial feedback that peers might otherwise provide. The detailed instructions are reproduced below:

(1) Initiating a feedback dialogue

When submitting an assignment, please always try to formulate a **specific feedback request**.

The purpose of a feedback request is to elicit specific feedback from your peers and the supervisor. Thus, you need to think about the concrete parts of your research project you are not sure about and want to discuss. Formulate **1 or 2 specific questions**, such as:

- “I am interested in two different topics and don't know which one to choose. I have listed several pros and cons on the digital board and would be grateful for your suggestions. Which one do you think is most feasible and relevant and why?”
- “In my research, I focus on XY and have already started to write the literature part. However, I am not sure about the most fitting structure or whether I forgot an important term in my table of contents. Could you please look at sections 2.1 to 2.4 of my table of contents (see upload)? What do you think?”
- “I have piloted my survey already and noticed that the responses for the open questions went into a totally different direction than the one that I had intended. So, I assume that maybe the formulation of my questions was not clear enough, or that a different data collection format would have been more suitable (e.g. closed questions or interview)? Can you please look at questions 4 + 5 of my uploaded draft and the three sample responses that I have received? Thank you!”

(2) Exchanging feedback (giving and taking)

In response to your peer's feedback request, try to give concrete suggestions and explanations.

Identify the **strengths** of your peer's work as well as the **areas for improvement**. Formulate your feedback in an appreciative, specific and constructive manner while nevertheless drawing your peer's attention to the aspects that are hard to understand, contradictory or need improvement for other reasons. **Explain** why you consider something as well done or as in need of revision or clarification. Give specific **suggestions** how the improvement could be reached, e.g. by providing concrete examples, by mentioning useful websites or by incorporating other helpful resources.

Bear in mind that you will obtain feedback from your peer as well; so, **imagine yourself being the feedback recipient** when giving feedback to your peer: What kind of feedback would you expect? In what way should it be formulated? Would you need some encouragement and motivation as well as constructive criticism that will help you improve?

Certainly, you will not be able to comment on all aspects that your peer might desire; you cannot give an expert opinion on everything because everybody has different backgrounds, interests, and resources available. In sum, however, peers find it usually very helpful to receive supportive comments as well as critical questions from a person who is in a similar situation or has gone through it recently (such as the different stages of the research process).

Remember that feedback is an **ongoing dialogue**. Not all feedback is perfect or easy to understand. Therefore, don't hesitate to ask questions for clarification in response to the

feedback that you have received. A **thanks** for the feedback and a **description of how you are going to use it** would be much appreciated as well.

10. Discussion and Conclusion

This chapter has provided detailed insights into the process of redesigning TESOL courses by means of digital feedback procedures. This process gained momentum in 2021 when external funding was granted and the university-internal process of the degree reform was started.

Overall, we have seen that digital feedback methods should be carefully aligned with the specific learning objectives. However, research has hardly ever been conducted on the suitability of digital feedback procedures for concrete tasks. The DFM project contributed to filling this substantial gap. At the same time, the redesign process cannot be considered as a closed one, as it needs to be reassessed continuously while responding to changed demands. One noticeable development has occurred in the field of AI since late 2022. With the release of ChatGPT (see chapter 16 by Schluer in this volume), many academics felt threatened but also recognized its affordances. Students seem to be curious in exploring it while also observing certain limitations.

There are also other digital feedback methods that are still underexplored, and one of them are digital feedback portfolios. In the current redesign of the TESOL curriculum that was presented in this chapter, e-portfolios were regarded as potentially beneficial for the students to encourage critical reflection. However, practical challenges were encountered, such as the accessibility of the digital portfolio across different courses and after graduation. While the use of Google Sites could help to overcome this challenge, it does not conform to the data protection policies of many educational institutions. Likewise, Google Forms was found to be advantageous for the reflective online surveys, as respondents were able to reconsult their responses on a later occasion. Ideally, then, an e-portfolio application should be chosen that is approved by the educational institution but at the same time accessible throughout the prospective teachers' professional life.

A commonality of all courses was that they combined self-directed with collaborative learning and were accompanied by regular feedback from the peers and teachers. The research gaps delineated above pinpoint further possible directions, notably AI-powered self-feedback and feedback from externals, such as in-service teachers or mentors. These additional directions could therefore be included in future pedagogical practice. The constant engagement in reflective practice (Dewey, 1910; Farrell, 2022; Schön, 1983) accompanied by research on the course designs (cf. e.g. Armstrong et al., 2020; Collins, 1990, on design-based research) may ultimately motivate the student teachers to enact such practices themselves. Likewise, by providing insights into the challenges that were encountered and the solutions that were explored, this chapter hopes to inspire other educators and encourage change processes in higher education through concerted efforts across modules.

Especially in an era that is characterized by ongoing technological advancements and pedagogical innovations, higher education should be a vanguard of continuous redesign in response to the evolving pedagogical demands. As prospective teachers are immersed

in pedagogical approaches that align with the latest advancements in research and technology, they are better equipped to navigate the dynamic landscape of teaching and cultivate the required competencies among their students. In that respect, digital feedback can help empower students to take on an active role in knowledge-seeking and critical reflection, which may ultimately lead to pedagogical innovation and ongoing improvements.

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Implementing Feedback Activities in a Curriculum Planning Course to Foster Preservice Teachers' Feedback Literacy: A Critical Reflection

Yarong Liu

Abstract *In the feedback literature, attention has been paid to digital literacy, feedback literacy, and digital feedback methods (DFMs). However, it is also substantial to investigate how to incorporate DFMs into lesson plans for English language teaching (ELT). Given that DFMs are advantageous for multifaceted reasons (see Schluer, 2022), it would be salient to guide preservice teachers (Pts) in applying them when planning ELT lessons. This involves their skills for designing and facilitating the feedback process from “ecological and sociomaterial perspectives” (Chan & Luo, 2021, p. 2). Because teacher feedback literacy is still in its infancy (O’Donovan, Rust, & Price, 2015), practical guidance for training Pts in that regard is rare. Bearing this gap in mind, this paper first reconceptualizes teacher feedback literacy by applying a transdisciplinary approach (Schluer, Rütli-Joy, & Unger, 2023) and experiential learning (Kolb & Kolb, 2012). Second, it critically reflects on feedback activities for guiding Pts in incorporating DFMs into the design of course and lesson plans. Building upon the reconceptualized framework of teacher feedback literacy and the teaching experiences, the chapter closes with suggestions for future feedback practices.*

Keywords *teacher feedback literacy; digital feedback methods; teacher training; curriculum planning; digital tools*

1. Introduction

The debate over feedback has reached a consensus on viewing it as a process (e.g., Chan & Luo, 2021). This conceptualization of feedback rejects “a one-way transmission of information” (Winstone, Nash, Parker, & Rowntree, 2017, p. 18) from teachers to learners. Effective feedback exchanges require teachers’ capacity to raise learners’ agentic awareness for active participation. Hence, a closer inspection of teacher feedback literacy is crucial. While a large body of this research exists, the literature on teacher training to foster teacher feedback literacy remains scarce (cf. Schluer, Rütli-Joy, & Unger, 2023, p. 161). Moreover, the conceptualization of teacher feedback literacy from a reductionist view no

longer aligns with the burgeoning feedback theories (cf. Schluer et al., 2023, p. 158). In addressing the gaps, this chapter critically reflects on feedback activities for guiding pre-service teachers (Pts) in incorporating digital feedback methods (DFMs) into the design of course and lesson plans. In addition, it applies a transdisciplinary approach (Schluer et al., 2023) and experiential learning (Kolb & Kolb, 2011) to revisit teacher feedback literacy and provide pedagogical guidance for future feedback practices.

2. Teacher Feedback Literacy

Although feedback literacy has been long researched with a shift towards learner-centered feedback practices (Zhan, 2023, p. 687), the conceptualization of teacher feedback literacy is still in its infancy (O'Donovan, Rust, & Price, 2015). For example, Carless and Winstone (2022) distinguished teacher feedback literacy from student feedback literacy. They emphasized that feedback-literate teachers should be able to create learning environments which foster students' "feedback literacy capabilities" (Carless & Winstone, 2020, pp. 2–4), i.e. seeking, making sense of, and using feedback (Malecka, Boud, & Carless, 2020). Teacher feedback literacy places emphasis on the role of a teacher in designing and managing the feedback process (Carless & Winstone, 2020, p. 2). It defines teachers' responsibility in guiding learners to recognize the value of feedback (Heron, Medland, Winstone, & Pitt, 2021, p. 3) for the purpose of self-regulated learning (Carless & Winstone, 2020; Xu & Carless, 2017; Zhan, 2022, 2023), including developing self-monitoring and self-evaluation skills (Xu & Carless, 2017, p. 1).

An increasingly prevalent approach to comprehending feedback takes "ecological and sociomaterial perspectives" (Chan & Luo, 2021, p. 2) into account. This involves textual, interpersonal, instructional, and sociocultural factors (Chong, 2021, pp. 8–9; cf. Schluer & Liu, 2024). In response to this, Carless and Winstone (2020) coined a three-layered model of teacher feedback literacy: design dimension (designing activities to support learners in becoming familiar with feedback and appreciating feedback), relational dimension (overcoming emotional barriers raised by sociocultural and interpersonal factors), and pragmatic dimension (considering teachers' and students' identities when using norms in feedback dialogues) (pp. 5–9). The model is built on the principle of responsibility-sharing but takes fixed roles for teachers and learners as its premise. Consequently, it fails to fulfill its promise of deconstructing the hegemonic power of teachers (cf. Schluer et al., 2023), because the fixed roles retain a convention of unequal power between teachers and learners. As Tai, Bearman, Gravett, and Molloy (2021) corroborated, Carless and Winstone's (2020) framework suggests teachers' unilateral decisions about when and how feedback should take place and what should be included in feedback (pp. 2, 6). Rather than regarding learners as inherent agents in the feedback process, Carless and Winstone's (2020) model relegates learners to passive roles, i.e. "less knowledgeable" (Tai et al., 2023, p. 206; cf. Gravett, 2022, p. 3) learners. It contrasts with the purpose of inverting the status quo to enable learner-centered feedback interactions (Tai et al., 2023, p. 209; cf. Schluer et al., 2023).

"Feedback as a social process" (Tai et al., 2023, p. 202) requires a conceptual reframing of teacher feedback literacy. The pathway to going beyond "a binary understanding"

(Schluer et al., 2023, p. 158) of teachers' and learners' responsibilities is acknowledging the continually changing nature of feedback contexts (Gravett, 2022; Tai et al., 2023). In doing so, teachers and learners are both situated in learning positions where the teachers' prior knowledge in feedback might not be operable (cf. Gravett, 2022; Tai et al., 2023). Therefore, all agents (teachers and learners) ought to become proactive, cooperative, and responsible of the feedback process (cf. Schluer et al., 2023, p. 155). In their efforts to facilitate this transformation, teachers need to partake in negotiating knowledge resources on individual, institutional, and interpersonal levels in the feedback process (Schluer et al., 2023, pp. 157–158; cf. Malecka et al., 2020; cf. Tai et al., 2023). In that regard, teacher feedback literacy should be associated with experiential learning (Tai et al., 2023; Zhan et al., 2022). Empirical evidence has shown that schoolteachers found experiential learning beneficial in enhancing their feedback literacy, such as writing reflective journals or conducting self-assessments (Zhan, 2022, p. 118). Experiential learning resides in “the learning situation” (Kolb & Kolb, 2011, p. 44), which might motivate not only teachers but also learners to reflect, think, and act upon influential actors that facilitate effective feedback interactions.

Supported by digital technologies, feedback can be conducted in manifold modes (e.g. written, audio, visual, multimodal), directions (e.g. teacher-student, peer-to-peer), with varying timing (e.g. synchronous, asynchronous), as well as methods and tools (e.g. Wiki feedback) (Schluer, 2022). Crucially, the use of technology and tools is not neutral (Gravett, 2022; Schluer et al., 2023; Tai et al., 2023). Teachers' ability to facilitate discussions about “material-economic” (Tai et al., 2023, p. 205) and “socio-political” (Tai et al., 2023, p. 206) power and structures with learners before, during, and after the feedback practices becomes requisite (Schluer et al., 2023; Schluer & Liu, 2024). The multiplicity of factors surrounding feedback urges us to rethink a more comprehensible approach to developing teacher feedback literacy. Schluer et al. (2023) posited “a multimodal, trans-disciplinary, and critical-transformative approach” (p. 159) to reach a pluralistic all-agent engagement. It expands to feedback strategies for fostering openness, mindfulness, and criticality (Tai et al., 2023, p. 210) in negotiating the interdepending and interplaying actors, including tools and sociolinguistic norms (Schluer et al., 2023, p. 161; Schluer & Liu, 2024).

Feedback as a social and discursive process (Schluer et al., 2023; Tai et al., 2023) requires continuous learning from teachers. More specifically, feedback-literate teachers should flexibly cope with sustainable changes in the feedback interactions to maintain equity between themselves and their learners (i.e. knowing when and how to intervene) so that learners will not refrain from active participation. Building on Carless and Winstone's (2020) framework, strategies proffered by Schluer et al. (2023), and principles in experiential learning (Kolb & Kolb, 2011), the conceptualization of teacher feedback literacy can be supplemented with more features: 1) facilitating open and honest discussion of the envisaged learning outcome between teachers and learners when designing feedback activities; 2) negotiating meanings (e.g. sociolinguistic norms and perceptions of using tools) and co-constructing knowledge and skills with learners for adjusting the feedback process; 3) reflecting on and acting on what has been experienced for modifying feedback design and developing strategies for dynamic feedback contexts.

3. Designing Feedback Activities

Feedback activities were designed for a curriculum planning and materials development course for master's students of *Teaching English to Speakers of Other Languages* (TESOL) in the winter term 2022/23 at a German university. In total, 11 students were enrolled and gave consent at the beginning of the course. The course provided the students with various teaching scenarios (e.g. improving writing skills via e-tandem learning; see chapter 2 on course re-design by Schluer in this volume). They were required to choose a scenario to design course and lesson plans collaboratively and learning activities individually. By the end of the course, the students should submit a paper to critically reflect on relevant theoretical frameworks (teaching methods/ approaches) and the activities that they had created. The implementation of DFMs in this course (15 sessions) was considered from three aspects: theoretical instructions, feedback practices, and students' own applications of DFMs in their course and lesson plans. The feedback activities were conducted in sessions 4, 6, 7, 8, 10, and 12 (see Table 1). Hence, not only the students incorporated feedback in their course design, but they likewise engaged in a variety of feedback activities during the curriculum planning seminar. To support Pts in accumulating experiences in feedback practices, the course activities were designed with specific learning contexts in mind where feedback timing, directions, methods, and tools varied.

Table 1: Digital Feedback Activities in the Curriculum Planning Course

Ses-sions	Activities	Digital feedback methods	Digital tools
4	Feedback on literature (Canagarajah, 2012; Guardado & Shi, 2007; Martin, 2015) Peer-to-peer; teacher-student Synchronous	Feedback in cloud editors	Google Docs
6	Feedback on literature (Malecka, Boud, & Carless, 2022) Peer-to-peer (Role play); teacher-student Synchronous; Asynchronous	Forum feedback	Wakelet
7	Feedback on literature (Erdemir & Yeşilçınar, 2021; He, & Yan, 2011; Pham, 2022) Teacher-student Synchronous	Poll feedback	Google Forms
8	Feedback on peers' group work progress Peer-to-peer; teacher-student Synchronous	Poll feedback	Mentimeter
10	Feedback on peers' presentations Peer-to-peer; teacher-student Asynchronous	Feedback in cloud editors	Padlet

Ses-sions	Activities	Digital feedback methods	Digital tools
12	Feedback on pros and cons of DFMs and digital tools Peer-to-peer; teacher-student Synchronous	Poll feedback	Mentimeter

The theoretical instructions were meant to raise Pts' awareness of the factors that are influential on the feedback process (e.g. sociocultural influences on online peer feedback by Guardado & Shi, 2007). Furthermore, they invited the Pts to discuss the literature on feedback literacy (e.g. Malecka et al., 2022) in order to gain theoretical knowledge of feedback principles and to incorporate feedback into course design. In line with the dimensions of feedback literacy, the activities were constructed in a stepwise manner: seeking, receiving, and using feedback. Additionally, the activities incorporated three DFMs, including feedback in cloud editors, forum feedback, and poll feedback. They were concerned with in- and outside-of-class possibilities (synchronous and asynchronous modes) and the learning contents (i.e. critical reflection on literature, groups' presentations). To implement them, various digital tools were utilized, such as Google Docs, Google Forms, Mentimeter, Padlet, and Wakelet. The use of the digital tools attempted to elicit a joint discussion of their affordances and limitations (DFMs and the tools) as a part of the reflection on the feedback process.

It should be noted that the feedback activities were designed before teacher feedback literacy was reconceptualized as stated above (section 2). The design of the curriculum planning course was therefore inconsistent with the literature review. The activities were intended to guide Pts in practicing feedback from both teachers' and learners' perspectives so that they can develop strategies for coping with barriers when implementing the DFMs. However, the design turned out to be problematic when the activities were implemented, which will be critically reflected in the following section.

4. Critical Reflection

The critical reflection draws on the instructor's own observations about students' participation in the feedback activities. Specifically, it aims to provide practical insights into Pts' attitudes towards DFMs and the use of digital tools. The following subsections will reconsider the feedback activities by responding to an updated literature review and applying the transdisciplinary approach in order to suggest some adaptive possibilities for future teaching practices.

4.1. Implementing the Feedback Activities

Session 4 combined collaborative and individual work on feedback in cloud editors. The instructor created a Google document for the students to synchronously answer literature-related questions in groups (see Table 1). Based on their answers, they should seek oral feedback from their peers and the instructor. The synchronous written electronic feedback was advantageous because the Pts could see who had contributed to the Google Docs. If they did not actively participate in it, the spotlight could easily be shined on them. It therefore seemed to increase their feedback engagement. Moreover, the written feedback activity left Pts ample time to thoroughly consider their arguments for the subsequent oral discussion, where they actively provided oral feedback to the instructor. However, the students did not interact with their peers during the discussion as anticipated, because they relied on the instructor's expertise to provide correct answers.

In session 6, the PTs were assigned to play the roles of teachers in a forum feedback activity. They should respond to their learners' quotes (e.g. feedback experience and attitudes towards peer feedback) on Wakelet (see Figure 1). Meanwhile, they needed to give feedback on their peers' comments both synchronously and asynchronously (for those who did not attend the class). This activity intended to train the Pts' skills to help their learners recognize the value of feedback, especially peer feedback. Because Wakelet allows the use of pseudonyms, the Pts actively participated in peer feedback exchanges without the fear of making mistakes or hurting peer relationships (see also Guardado & Shi, 2007, p. 446). They shared multilayered strategies for designing more learner-centered feedback activities and responded to their peers' posts. Through their feedback dialogue, the Pts became aware of the importance of teacher feedback literacy ("It is important to foster your students' feedback literacy as well as your own, instructor feedback literacy", Pt 3). At the same time, they could reflect on the literature and provide specific instructions for increasing learners' active engagement (see Figure 1). Apart from introducing the commenting function on Wakelet, the instructor did not illustrate other multimedia functions, such as inserting images or YouTube links, which could afford multimodal learning.

Session 7 used Google Forms to conduct a poll feedback activity. This activity employed the multiple-choice question function in Google Forms because it granted the possibility of giving answers from diverse perspectives (see Figure 2). The assigned questions were based on the literature (see Table 1) and students were allowed to select answers according to their own perceptions. The activity encouraged them to use their own words to demonstrate their comprehension of the literature. Moreover, because there were discrepancies in the answers, students showed more interest in seeking and providing peer feedback to argue for their positions.

Figure 1: Forum Feedback Activity on Wakelet

Quote 1:
 I struggle with trying to figure out how to deliver effective, constructive feedback without alienating interns, without overwhelming them. There is a culture of not wanting to hurt each other's feelings and being awkward in delivery.
 (Ramani et al., 2018, p. 1352)

I would also agree with anonymous zebra that it is important to engage in feedback frequently in order to take away the 'awkwardness' that might arise when being faced with feedback. It is also important to distinguish between feedback and critique.


 Anonymous Parrot

Figure 2: Poll Feedback Activity on Google Forms

1. What are the affordances of micro-teaching? (n=5)



Session 8 involved peer feedback on the group work progress. To provide peer feedback, the Pts needed to take notes while listening to their peers' presentations. The feedback activity was conducted through polling in Mentimeter, followed by verbal explanations. The word cloud function in Mentimeter allowed participants to write one or more key words when providing feedback, without great efforts. Using the word cloud as prompts (see Figure 3), the Pts were more motivated to give additional verbal feedback. They engaged in the oral feedback exchange as if they were introducing their visual product. As compared to the previous feedback activities, the peer interactions were much more frequent in this session. As a follow-up, the instructor invited the Pts to reflect on the impact that DFMs, digital tools and their features have on their motivations by comparing their learning experiences in the current session and in the previous sessions.

teaching activities and enhance their abilities to apply the methods in different contexts. To achieve these aims, the session used two types of features in Mentimeter to conduct the poll activity: a word cloud and multiple-choice questions. In addition, a Likert-scale question in Google Forms was employed. The activity was conducted by asking questions (e.g. do you think there are more advantages than disadvantages to poll feedback activities?), polling, and discussing. To conduct the activity, the lecturer picked the key words from the word cloud to ask for further explanations. Not only did the student who wrote the key word gave oral feedback, but other students also participated in the discussion. Comparatively, the multiple-choice questions provided more materials to scaffold oral feedback production. Likewise, the Likert-scale questions visually presented diverse perceptions through the rating scale and thereby helped raise participants' interests in discussing the discrepancies.

Since the original course design did not yet follow a reformed understanding of teacher feedback literacy as advanced above in section 2, the implementation merely guided the Pts in experiencing and exploring the affordances and limitations of DFMs and digital tools. During the activities, the Pts needed to shift between teacher and learner roles. This was meant to help the Pts comprehend the tension caused by the power distance between teachers and learners as a prerequisite to becoming literate in designing and facilitating feedback dialogues. However, the implementation turned out to be constrained by the fixed roles of teachers and learners. Pts were either assigned to act out their expertise as teachers in providing feedback to their learners or played as learners to complete the feedback tasks assigned by the instructor. As learners, they were not encouraged to challenge the instructor's design of the feedback activities, even though they were at times reluctant to complete the tasks (see Sessions 4 and 10). The design did not create a chance for Pts to co-modify the feedback activities with the instructor. It failed to create modeling effects for Pts to observe how to design feedback process that are based on responsibility-sharing (Tai et al., 2023).

4.2. Suggestions for Future Feedback Practices

Applying the transdisciplinary approach (Schluer et al., 2023) and the experiential learning theory (Kolb & Kolb, 2011), future feedback practices and training programs that aim to foster teacher feedback literacy should adopt an open structure for modification. More importantly, the potential modification should be considered even before the implementation takes place. Thus, teachers can explain the contents and objectives of the feedback design to learners and ask for their learning goals as well as their motivation to participate. If teachers provide several feedback activity designs (various feedback directions, timing, methods, and tools instead of yes-or-no questions), learners might be more motivated to share their honest opinions. Moreover, learners might raise agentic awareness of feedback when being invited to co-design feedback activities. During the implementation, teachers need to remind learners of their learning objectives of the feedback activities. Learners should be intrinsically motivated to negotiate meanings and co-construct knowledge in order to adjust their feedback actions and roles in the feedback process. The responsibility is therefore shared intuitively, not given/ permitted by teachers.

In this vein, learners would also conceive themselves as responsible for reflecting on their feedback practices to become more strategic in their future feedback interactions.

Compared to asynchronous modes, synchronous feedback was found to be more motivating for learners to provide peer feedback. Because asynchronous feedback (e.g. audio feedback) merits multifaceted affordances (e.g. being easy to navigate) (Schluer, 2022, p. 63), strategies for increasing learners' participation in this mode should be recommended. When conducting asynchronous feedback activities, teachers can invite learners to select their group members (Myers, 2012, p. 58). Myers (2012) found out that because self-selected groups shared "trust, and relational satisfaction" (p. 58) among members, they contributed to "higher levels of commitment" (p. 58) than randomly assigned groups. In addition, clear labor division in group work might also help increase learners' motivation to participate (Lai, Lei, & Liu, 2016). For that, the instructor can remind learners to take on different roles in the group work: who takes notes during presentations or group discussions, who searches for literature to provide constructive suggestions, who formulates feedback, and who fine-tunes the language use in the feedback (see also Sauders, 1989, as cited in Lai et al., 2016, p. 81).

To improve efficiency during this process, group members can reach consensus on the deadlines of individual tasks, feedback methods, and digital tools in the first place (cf. Myres, 2012, p. 60). In creating a friendly climate in groups, these roles should not be fixed but negotiable (cf. Myres, 2012, p. 52), as members might need help from others. To instantiate, the negotiation of linguistic norms in the feedback needs diverse opinions (cf. Schluer & Liu, 2024). Overall, both joint and discrete efforts by each group member can be an invisible force among learners to complete their feedback production. If one of them is interested in completing the peer feedback task, other group members might follow because they had already shared equal work beforehand. It can create a monitoring effect among group members and across groups.

5. Conclusion

Teacher feedback literacy is not yet fully defined and intertwined with other disciplines. The implementation of the feedback activities presented in this chapter has revealed several limitations arising from the fixed roles of teachers and learners. Taking session 4 as an example for modification, the instructor could share responsibility with the Pts in the feedback process by asking them to formulate questions on their own to check their peers' comprehension. By that, learners would rather seek explanations (feedback) from their peers than from the instructor, because their peers are the producers of the questions. This way, learners' agentive awareness can be raised.

To facilitate learners' roles in co-designing feedback activities, teachers need to become more familiar with learners' affective and individual needs, learning goals, and sociocultural backgrounds (cf. Schluer & Liu, 2024). This can be realized by guiding learners in sharing their preferences for feedback contents, modes, methods, and digital tools before, during, and after feedback activities (cf. Schluer & Liu, 2024, p. 141). For a future-oriented feedback design (cf. Schluer et al., 2023, p. 159), the co-writing of reflective journals with learners would be necessary (cf. Kolb & Kolb, 2011; Zhan, 2022). Through reflec-

tive journals, learners can collaboratively reflect on the affordances and limitations of the feedback activities for a redesign. This can heighten learners' agentic awareness in the feedback process, because this step positions students as teacher colleagues, not as less knowledgeable learners.

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Guiding and Inspiring Teachers to Incorporate Feedback in Course and Task Design: An Interactive Feedback Taxonomy

Jennifer Schluer

Abstract *In contemporary conceptualizations of feedback, teachers play a key role in developing pedagogical designs that facilitate student learning through feedback (Boud & Dawson, 2023; Carless & Winstone, 2023). However, practical guidance for teachers is scarce or often remains on a rather abstract level. The present chapter therefore introduces an interactive feedback taxonomy to guide and inspire teachers in the pedagogical planning process. It is based on a qualitative scoping review of 135 empirical studies (Brück-Hübner & Schluer, 2023) as well as relevant literature and practical experience in teacher education. The chapter outlines the seven main dimensions of the feedback taxonomy, along with reflective questions for their manifold design options. It can be consulted by pre- and in-service teachers, either individually or as part of curriculum planning courses or professional development workshops. Beyond pedagogical planning at the micro- or meso-level of single tasks or courses, it can also assist in curricular macro-level processes to transform or innovate existing feedback designs.*

Keywords *feedback; course design; pedagogical planning; professional development; feedback taxonomy*

1. Introduction

Recent years have seen a renewed interest in the teachers' role in feedback processes. Therein, teachers are considered as designers of educational environments that facilitate student learning through feedback (Boud & Dawson, 2023; Carless, 2022; Carless & Winstone, 2023). However, existing conceptual frameworks do not provide clear guidance for teachers to navigate the plethora of possibilities and “engage in pedagogical planning for their unique classroom environments” (Kaya-Capocci et al., 2022, p. 1). Based on a systematic review of the empirical literature (Brück-Hübner & Schluer, 2023), the present paper proposes an instrument to help teachers incorporate feedback procedures into their course and task design. More precisely, it presents an interactive website that

builds on and expands the feedback taxonomy that Brück-Hübner and Schluer (2023) derived from their qualitative scoping review of feedback studies in higher education. Since their review only covered journal articles from a limited time period and database, it also contained a few gaps which are now addressed by the expanded online version of the feedback taxonomy.

To lay a theoretical and conceptual foundation, the current chapter will explain central terms first and inspect existing teacher feedback literacy frameworks for curriculum planning and task design. While these models outline several competencies of feedback-literate teachers and contain general recommendations for pedagogical planning, teachers might face challenges in utilizing them for the incorporation of feedback processes in their courses. A feedback taxonomy will therefore be introduced that intends to inspire and guide teachers to transform the variety of pedagogical options into curriculum planning and task design. Rather than pre-determined options, it contains numerous reflective questions to stimulate critical thinking and creative design innovations. Finally, the chapter closes with suggestions for future studies and teaching practice.

2. Terminology and Literature Review

In this section, relevant key terms will briefly be defined before existing frameworks for pedagogical design will be reviewed from the lens of teacher feedback literacy.

2.1. Feedback Literacies

Current conceptualizations of feedback literacy emphasize the distinct but intertwined responsibilities of learners and teachers (Carless, 2022; Carless & Winstone, 2023; Nash & Winstone, 2017; Tai et al., 2023; Winstone & Carless, 2020). They place an emphasis on the active role that learners need to take throughout the feedback process, while teachers are responsible for adequate pedagogical designs. More precisely, **learner feedback literacy** is defined as the knowledge, dispositions (attitudes and willingness), strategies and capacities students need to seek, produce, understand and utilize feedback to enhance their learning (Carless & Boud, 2018, p. 1316). **Teacher feedback literacy**, in turn, “comprises design, relational and pragmatic aspects” (Carless, 2022, p. 145) needed to enable feedback processes which facilitate student uptake, including considerations of interpersonal, affective and contextual aspects (Carless & Winstone, 2023). This necessitates the negotiation of a shared understanding of the feedback concept, sufficient feedback opportunities, as well as teachers’ support (guidance, modelling, coaching) throughout the feedback process (cf. Carless & Winstone, 2023, p. 152). Teachers thus create the conditions that would foster students’ feedback literacy and their learning from the feedback. As Carless and Winstone (2023) put it, teacher feedback literacy is “the knowledge, expertise and dispositions to design feedback processes in ways which enable student uptake of feedback and seed the development of student feedback literacy” (p. 153).

2.2. Pedagogical Design

As we have seen above, pedagogical design is an important dimension of teachers' feedback literacy (Carless & Winstone, 2023; Winstone & Carless, 2020). In general, **pedagogical design** refers to the process and product of creating teaching and learning environments that support student learning. It encompasses various systematic choices as part of curriculum planning, course design, task design, and materials development. In that respect, it emphasizes the use of instructional strategies that consider the needs of the students to facilitate meaningful and engaging learning experiences. Zooming in on pedagogical design as a central dimension of teacher feedback literacy, Carless and Winstone (2023) highlight educators' ability to

- (1) "Design curriculum and assessment sequences to encourage student generation and uptake of feedback;
- (2) Support students in making judgments about their own work and that of others, through activities such as peer feedback and evaluating exemplars;
- (3) Use timely guidance and intrinsic feedback to make expectations clear and avoid the problem of post-task feedback coming too late for student uptake;
- (4) Deploy technology, as appropriate, to facilitate feedback engagement and uptake." (p. 154)

There are also more exhaustive lists of suggested practices by Winstone and Carless (2020, p. 170) or in the review article by Boud and Dawson (2023). While they comprise several important facets, teachers might have difficulty in enacting them, since learning objectives and classrooms vary to a considerable extent. What, then, is meant by an "appropriate" design of courses and tasks that facilitate students' active engagement in the feedback process? Clearly, such a pedagogical design requires a consideration of different variables and their interrelationships. First and foremost, these include the learning objectives, the learners as well as the learning activities (and their sequencing) to reach the learning goals. The concertation of regular and appropriate feedback opportunities should be granted by taking into account social, affective, communicative as well as the technological dimensions.

Crucially, feedback should not be a singular and isolated event, but an integral part of curriculum design in which multiple and multidirectional feedback opportunities are enabled (Boud & Molloy, 2013, pp. 699–700). Feedback therefore needs to be "designed into learning processes from the outset" of curriculum planning (Winstone & Carless, 2020, p. 9). Therein, student agency should be fostered and foregrounded through "ongoing cycles" of feedback and learning, through which students progressively build their skills in judging and improving the quality of their work (Winstone & Carless, 2020, p. 94). In other words, "the design of multiple, sequential, and nested tasks, where comments on students' work can be applied to future tasks and learning opportunities" is "[f]undamental to [such] a curriculum approach to feedback" (Winstone & Carless, 2020, p. 9).

Boud and Dawson (2023) refined and reorganized Carless and Winstone's (2023) three dimensions into micro-, meso-, and macro-levels within their "Teacher Feedback

Literacy Competency Framework” as follows: (1) macro-level: program design and development; (2) meso-level: course module/unit design and implementation; (3) micro-level: feedback practices relating to individual student assignments (p. 161). These three layers are intertwined and collectively address various aspects of curriculum development, course design, and lesson planning.

Competence area (1), i.e. the macro-level, stresses the need to plan feedback opportunities strategically on a wider scale, i.e. beyond individual assessment tasks (Boud & Dawson, 2023, p. 161). For example, this could refer to systematic feedback designs stretching across course units or even across modules within or beyond specific degree programs (see chapter 2 on course redesign by Schluer in this volume). Clearly, this requires concerted efforts among colleagues as well as with the responsible managerial boards and policymakers, especially when several subject disciplines are involved. In contrast to changes in single courses, such an overarching endeavor promises to strategically build learners’ feedback literacy throughout their studies. This way, repetitions of foundational feedback trainings can be avoided, while giving more room to explorations of a variety of feedback procedures throughout the curriculum (cf. Winstone & Carless, 2020, p. 167: “Connectivity of learning across modules”). Moreover, human and technological resources would be pooled effectively, leading to a reduction of individual teachers’ investments (Boud & Dawson, 2023, pp. 161–162). Furthermore, the exchange with colleagues could be enriching, motivating and inspiring for teachers and encourage dialogue across disciplines (cf. Boud & Dawson, 2023, p. 162; see the transfer fellowship by Schluer & Meier, 2024). On the other hand, it not only requires long-term preparatory planning, but also regular monitoring and revisions concerning the suitability of the (cross-)curricular feedback design. Overall, however, such wider-scale planning could help to make feedback a more natural part of learning and teaching as well as lead to a deeper understanding of the feedback construct and contents.

Zooming in a bit further, competence area (2) addresses the organization of feedback events at the meso-level, i.e. within a course or course unit. Therein, the sequencing of tasks and feedback processes becomes crucial. Ideally, there will be a continuous and multidirectional feedback dialogue in the course, with feedback from one task being useful for students’ work on the subsequent task and so on (Boud & Dawson, 2023, pp. 164–165; Winstone & Carless, 2020, p. 79). In addition, learners’ feedback skills will be developed progressively, e.g. by becoming more familiar with assessment criteria and by becoming confident in peer-feedback, self-feedback, and student-to-teacher feedback. In that respect, they can try out and discuss the use of different modes of feedback delivery for specific learning objectives and task types (e.g. Schluer, 2023b; Schluer, in prep.; Liu, chapter 3 in this volume). Crucially, teachers should design their courses in a way that fosters students’ active engagement through all stages of the feedback process, from feedback requests to feedback provision and feedback utilization (cf. Winstone & Carless, 2020, pp. 97–114, 170, 185). Learners could co-create success criteria and feedback guidelines (p. 81), but also contribute by suggesting additional (digital) tools for feedback exchanges (see social media chapter 12 by Schluer in this volume). Moreover, teachers might encourage students to utilize additional feedback sources beyond the confines of the course, e.g. by consulting learning advisors (Boud & Dawson, 2023, p. 166), internet resources or AI tools (see chapters 16 and 17 by Schluer in this volume). If available,

educators could activate learning analytics on the course platform so that students can trace and reflect on their development (cf. Boud & Dawson, 2023, p. 166). As suggested by Winstone and Carless (2020), learning analytics dashboards might usefully “be combined with e-portfolios, to enable students to curate artefacts and feedback that chart their learning journey” (p. 63; see also Winstone & Carless, 2020, p. 48, ch. 4, and Schluer, 2022, pp. 222–223, on the idea of digital feedback portfolios).

Finally, at the micro-level, competence area (3) is devoted to individual students’ needs at particular points in time (Boud & Dawson, 2023, p. 166). For this, teachers (and students) require diagnostic skills to fine-tune their comments (Boud & Dawson, 2023, p. 166) and scaffold the learning process within the learners’ zone of proximal development (Vygotsky, 1978). As Boud and Dawson (2023, p. 166) explain, it is about making the feedback not only “useful” but also “usable” for the student. This also relates to decisions about the feedback modality and technology used (Boud & Dawson, 2023, p. 166). Such an individual differentiation can be time-consuming, but there might also be certain fits between task types and feedback modes (see “Contexts of Use” pages on the “Digital Feedback Map” by Schluer, 2023a: <https://tinyurl.com/DigitalFeedbackOverview>).

Altogether, it becomes evident that teachers play an important role in carefully crafting and coordinating feedback events in the classroom and curriculum. In contrast to previous beliefs, they are not simply responsible for delivering feedback comments to the learners, but for creating feedback designs that foster and enable learners’ active participation in feedback seeking, feedback provision and feedback use (cf. Boud & Molloy, 2013; Winstone & Carless, 2020). In view of the multi-faceted pedagogical possibilities, some practical guidance would be helpful that educators can consult to gain orientation and inspiration about potential feedback designs. As a complement to the “Digital Feedback Map” (DFM; available at <https://tinyurl.com/DigitalFeedbackOverview>) that only centered on digital feedback designs, a meta-map was created as a follow-up to the DFM project by Schluer (2023a). This meta-map also builds on the feedback taxonomy that was derived by Brück-Hübner and Schluer (2023) through a qualitative content analysis of existing feedback research. Previous and current work on feedback taxonomies will therefore be briefly reviewed next.

2.3. Feedback Taxonomies and Educational Frameworks

Taxonomies are classification systems that help to structure the manifold dimensions of a phenomenon (see the review by Brück-Hübner & Schluer, 2023, p. 128). They serve several functions, e.g. to provide information and guidance, and also help to advance theorization about a topic as well as to encourage innovation in teaching practice (cf. e.g. Baumgartner, 2006; 2012).

One of the most popular taxonomies in educational contexts is Bloom et al.’s (1956) taxonomy of learning outcomes (Anderson et al., 2001). It concentrates on the cognitive domain of learning and distinguishes between six dimensions of increasing cognitive complexity: knowledge, comprehension, application, analysis, synthesis, evaluation. Affective, relational, and contextual variables that shape the learning process are, however, largely ignored in this taxonomy. Contemporary guidelines for course design, such as the

Qualifications Framework for Higher Education Degrees in Germany (Bartosch & Hiller, 2017), therefore highlight four competencies that should be fostered in higher education, i.e. knowledge and understanding; application, utilization and generation of knowledge; communication and cooperation; and scientific self-understanding/ professionalism.

Moreover, in recent years, the so-called “Future Skills” have become a buzzword in the educational discourse (see Stifterverband für die Deutsche Wissenschaft, 2021). They comprise an array of 21 competencies that are categorized into “classical competencies”, such as intercultural communication, creativity, problem-solving and resilience, “technological competencies” (e.g. knowledge about data analytics and AI), “digital key competencies” required for participation in a digitalized world, and “transformative” competencies to help resolve societal challenges (Stifterverband für die Deutsche Wissenschaft, 2021). For the latter, skills in change management are essential, such as setting goals, making informed judgments, and generating (innovative) solutions, paired with interpersonal skills in managing dialogues and conflicts. Similarly, the OECD Learning Compass 2030 (OECD, 2018) foregrounds transformative competencies and thereby emphasizes learner agency and co-agency as key elements. Altogether, these frameworks build on the “4Cs of Education”, which are “critical thinking and problem solving”, “creativity and innovation”, “communication” and “collaboration” (Trilling & Fadel, 2009). Teachers and educators can help to develop many of these skills by creating pedagogical designs that resonate with contemporary conceptualizations of feedback literacy.

Existing frameworks of the feedback process, however, mostly concentrate on individual aspects of the complex construct, including learner or teacher competencies, characteristics of the feedback message, interpersonal dimensions, or sociomaterial factors of the learning environment (see the review by Schluer & Brück-Hübner, 2024, p. 2). Others, such as the MISCA model (Lipnevich & Panadero, 2021; Panadero & Lipnevich, 2022), organize the complexity into superordinate dimensions, i.e. the feedback message (M), implementation (I), student (S), context (C) as well as the (inter-)actions of all agents in the feedback process (A). However, many of these models and frameworks might be too static, abstract or general for educators who seek explicit advice for creating pedagogical feedback designs (cf. Kaya-Capocci et al., 2022, p. 1). Thus, to assist teachers in this process, a taxonomy is still missing that mirrors and organizes the diversity of feedback designs. Brück-Hübner and Schluer (2023) therefore conducted a qualitative content-analytical scoping review to create a comprehensive taxonomy which aims to facilitate a systematic and differentiated description of didactic feedback designs and could likewise inspire future research studies and teaching practice.

3. Methodology

Faced with the plurality of possible pedagogical scenarios, teachers might need guidance and inspiration for the development of adequate feedback designs in their curriculum planning and course as well as task design. To obtain an overview of existing feedback practices, Brück-Hübner and Schluer (2023) as well as Schluer and Brück-Hübner (2024) conducted a review of published feedback interventions in higher education. More precisely, the authors applied a qualitative scoping review to identify the breadth of peda-

gogical feedback designs in existing research (Grant & Booth, 2009, p. 101). Throughout this process, they paid close attention to potentially differing conceptual understandings of feedback practices. While doing so, they followed the principles of qualitative content analysis by Kuckartz (2016) as well as Gläser and Laudel (2010) to explore the terrain in an open manner.

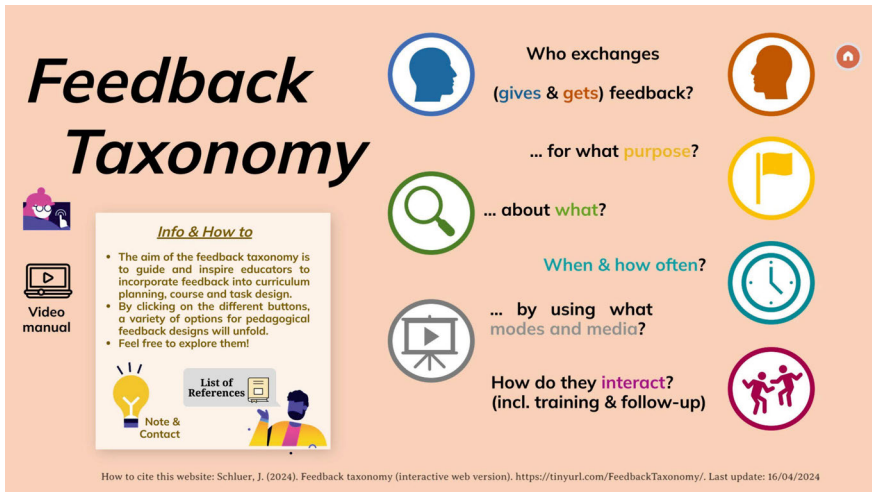
In conducting this scoping review, Brück-Hübner and Schluer (2023) examined 1,134 peer-reviewed journal articles that were published in English between January 2018 and July 2022 and were freely accessible in the ERIC database. The authors screened the abstracts to ensure that the articles dealt with intervention studies about feedback in higher education. While this already caused a reduction to 202 studies, the subsequent detailed scrutiny of the methodological sections of these articles revealed another criterion for exclusion, i.e. a lacking description of feedback practices. Consequently, 135 studies remained, whose methodological sections were manually coded in a software program for qualitative data analysis, i.e. MAXQDA 2022. After the initial coding, Brück-Hübner and Schluer (2023) consensually structured the codes into a category system (the feedback taxonomy), which eventually comprised seven main categories and around 250 subcategories (for details see Schluer & Brück-Hübner, 2024). From a practical perspective, these categories serve to answer key questions of pedagogical feedback designs.

Building on the initial findings by Brück-Hübner and Schluer (2023) as well as Schluer and Brück-Hübner (2024), the present chapter seeks to describe and interpret the dimensions of the feedback taxonomy from the practical perspective of pedagogical design. For this purpose, I transformed the category system into an interactive map which is publicly accessible via the following link: <https://tinyurl.com/FeedbackTaxonomyEN> (Schluer, 2024). Like the originally derived classification, the interactive website is meant to be understood as an open system that can be expanded by new developments. In fact, the website already contains several subdimensions that had not been included in the limited number of studies reviewed by Brück-Hübner and Schluer (2023). Notably, videoconferences were almost entirely absent in the reviewed papers even though they had turned into a popular medium for feedback exchanges since the Covid-19 pandemic (Brück-Hübner & Schluer, 2023). Moreover, Brück-Hübner and Schluer (2023) noticed that the initially retrieved but eventually discarded studies showcased further instantiations of feedback directions, e.g. peer feedback among teachers (Kanuka & Sadowski, 2020), or feedback by workplace practitioners to university students (Vencille et al., 2021). However, these publications had to be excluded from the final list of 135 studies because they did not meet all criteria for inclusion. Another difference to the original taxonomy is that the category labels were transformed into reflective questions to meet teachers' needs. The use of guiding questions is meant to facilitate the navigation of the interactive map and resonates with the idea of creative exploration and innovation. The contents of this expanded feedback taxonomy will be introduced in the following section.

4. Contents of the Interactive Feedback Taxonomy

Altogether, the feedback taxonomy by Brück-Hübner and Schluer (2023) comprised seven categories, which were transformed into guiding questions for teachers who plan to (re-)design their courses through feedback processes. The seven categories are represented by unique symbols, as illustrated in Figure 1.

Figure 1: The Seven Categories and Guiding Questions of the Feedback Taxonomy



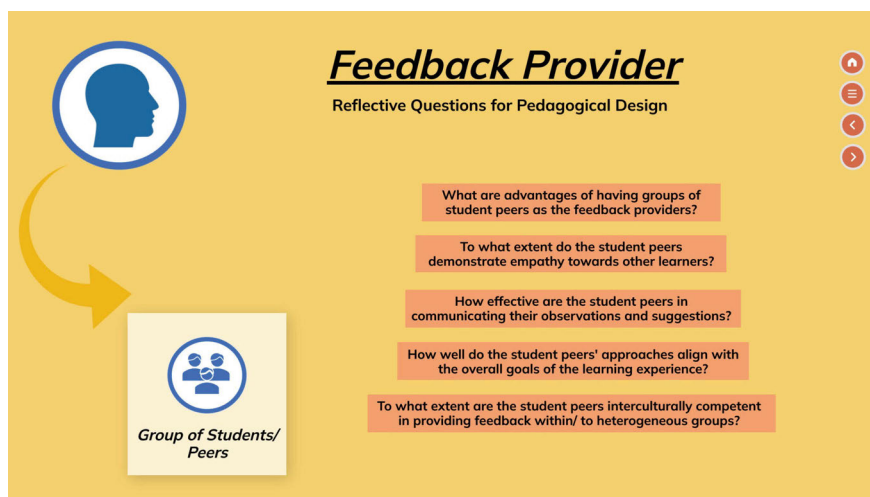
In the next sections, more detailed information about each category will be given.

4.1. Questions about Feedback Provision

Based on Brück-Hübner and Schluer's (2023) review, the feedback provider category unfolds into four subdimensions and guiding questions, respectively. The first question is "Who gives feedback?". For this, the review yielded nine possibilities: teacher, mentor, tutor, student peer, learner, self, supervisor/ external expert, affinity group, or technology/ system (for details see Schluer & Brück-Hübner, 2024, pp. 5–6). Moreover, the categories "teacher", "student peer" and "learner" can be further subdivided into "single" or "group", e.g. "a single student peer" or "a group of student peers". In addition, technology-based feedback comprises subcategories such as "Student Response Systems", "Automated Correction Systems", "AI, Intelligent Tutor, Bot".

The next question is "Which status do the feedback providers have?". In peer scenarios, the feedback providers can have the same or higher levels, e.g. with regard to knowledge in a particular subject field, language proficiency or strategy use. Furthermore, groups of learners can consist of current students and/ or alumni. Some sample questions are provided in Figure 2.

Figure 2: Reflective Questions for Groups of Students as Feedback Providers

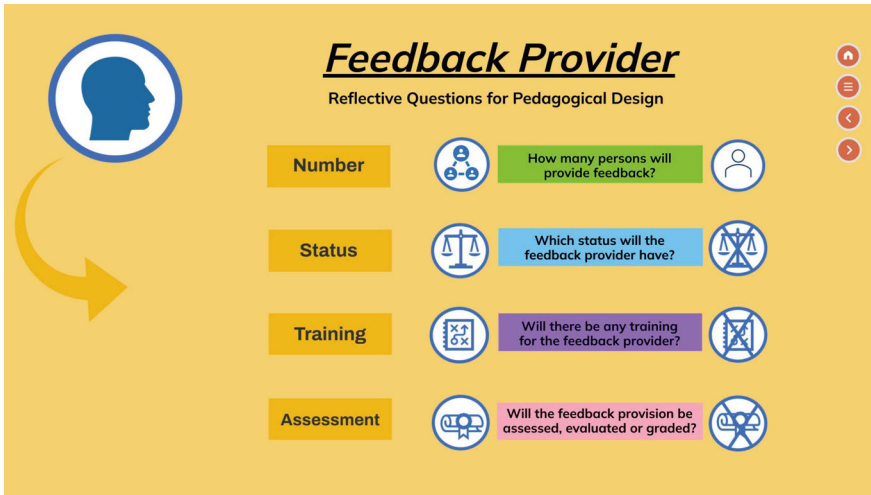


The third question is “Is there any training for the feedback providers?”. In that respect, feedback givers might be “trained” or “not trained.” In fact, however, this subdimension is gradual rather than dichotomous in nature. The review of studies by Brück-Hübner and Schluer (2023) showed that there can also be substantial differences with regard to the scope, design and intensity of the feedback training sessions. To exemplify, students might receive a training prior to the feedback session or additional coaching during the feedback activity. They could co-construct assessment criteria together with the peers and the teacher, or they are requested to follow guidelines set by the teacher. Concerning the mode, training might be limited to the provision of a handout or could occur via “peer feedback screencast training sessions” (Irwin, 2019, p. 466) or in face-to-face meetings (Waleed Daweli, 2018, p. 273). Thus, questions of medium and mode (see category 5) as well as frequency and intensity (cf. category 6) are also relevant for the training phase, not just to the actual feedback provision. Consequently, further questions to be addressed in this category are “To what extent are the feedback providers trained, and in what ways does the feedback training occur?”

Finally, the last question in this category is whether the quality of feedback provision is assessed, evaluated, or graded in the educational setting. This question turned out to be particularly relevant for students as feedback producers, either in peer feedback or self-feedback scenarios. In the first place, the answer to this question is either yes (“assessed/ graded”) or no (“not assessed/ graded”). Upon closer examination, there can be further differentiation, e.g. whether the evaluation is simply part of feedback training or whether (and to what percentage) it counts towards the final grade in a seminar.

A summary of these four major access points is depicted in Figure 3 and is likewise offered for other categories of the interactive feedback taxonomy.

Figure 3: Four General Considerations for Pedagogical Design for Feedback Provision



It should be noted that the background color of the pages as well as the colors of the symbols change with each major category for easier navigation and recognizability.

4.2. Questions about Feedback Reception

The second category centers on the question “Who receives feedback?”. In theory and practice, design options similar to those for the first question are plausible. However, the review yielded a somewhat divergent picture. The answers to this question were teacher, student peer, learner, self, external expert, study program coordinators, and fictional person (Schluer & Brück-Hübner, 2024, p. 6). Two new categories thus emerged (study program coordinators and fictional person), whereas “affinity group” and “technology/system” were not mentioned. However, feedback to a system is possible, e.g. feedback about the quality of responses an AI bot provides (see chapter 16 by Schluer in this volume). In addition, the feedback recipients can be single students, peers or teachers, or groups.

Secondly, feedback recipients can be further categorized according to their training status. In that regard, the following question can be asked: “Is there any training for the feedback recipients?”. This category might be specified further by asking “to what extent are the feedback recipients trained and in what ways does the feedback training occur?” For example, are guiding questions provided by the teacher to help learners reflect on the feedback and clarify their understanding of it, or are sample action plans issued to the students to guide them in their self-regulated learning endeavor? How much time is devoted to the feedback training?

Another question relates to the ways in which the feedback reception is assessed (or not). Commonly, the comprehension of the feedback is deduced from revisions of the assignments or from action plans that are set up. These contemplations intersect with question 7 and are therefore part of that category (see below for details).

4.3. Questions about Feedback Content

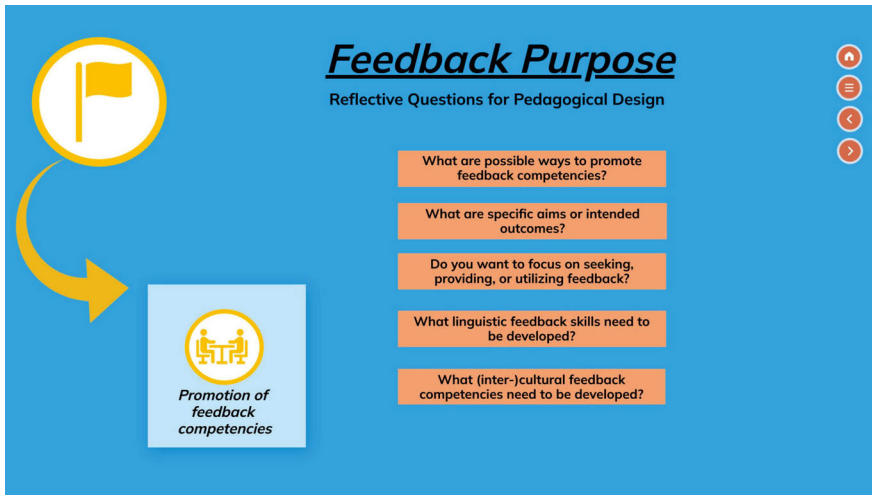
The third category of the feedback taxonomy is “Feedback content”. In the first place, the following question can be asked: “What does the feedback refer to?” Three categories emerged in response to this question, i.e. “product”, “process”, and “course/university experience”. For each of them, several options are conceivable (see Schluer & Brück-Hübner, 2024, pp. 6–7, for details). For products, they pertain to the medium and task type, e.g. written, oral or multimedia (see also section 4.5). With regard to processes, the feedback might refer to individual or collaborative work. The assessment could be focused on certain criteria or address several of them, e.g. “structure”, “content”, “language and style”, “formalities (e.g. citation, layout)” and “originality/creativity”. Furthermore, the feedback on “courses/university experience” may occur in a standardized manner via evaluation surveys or via various formative procedures (see also section 4.6 about feedback timing). It can relate to questions about the course structure and contents, the student interaction and course management as well as to characteristics of the hybrid, online or on-site environment. Decisions about the feedback content are to a large extent conditioned by the purpose of the feedback, which will be dealt with next.

4.4. Questions about Feedback Purpose

For any feedback design, the objective of feedback provision is pivotal. As a response to the question “What is the purpose of the feedback?”, the scoping review yielded the following options: “correction”, “learning support”, “motivation/ encouragement of the attitude”, “activation”, “promotion of feedback competencies”, “improvement of the (feedback) methodology/training”, “improvement of teaching/ teaching skills”, “study program evaluation/accreditation”, “collection of information” and lastly “increase of transparency/comprehensibility of assessment” (see Brück-Hübner & Schluer, 2023; Schluer & Brück-Hübner, 2024, p. 7). To avoid overloading the feedback recipients and sustain their motivation, a clearly defined purpose is recommended, which should also be mirrored in the actual feedback contents and assessment criteria (see category 3). In that regard, the web version of the feedback taxonomy offers numerous guiding questions for educators. For instance, when the promotion of feedback competencies constitutes the purpose of the feedback, the reflective questions listed in Figure 4 might prove useful.

Likewise, for many of the other above-listed purposes, finer distinctions can be made, e.g. “What is the specific purpose of correction?” or “In what ways should the feedback recipient be motivated?” Often, several purposes apply at once, which, however, might not be immediately discernible for the feedback recipient. In that respect, the mode and style of feedback delivery is influential, as will be pointed out in the next paragraph.

Figure 4: Reflective Questions for Fostering Feedback Competencies



4.5. Questions about Feedback Media and Modes

This category encompasses the manner, media and modes through which feedback exchanges take place. They are captured by the overarching question “How is feedback exchanged?”.

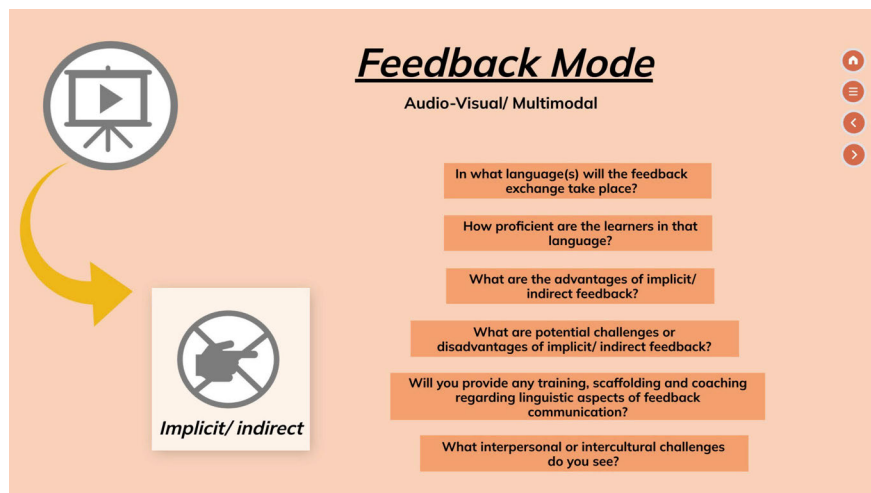
The feedback mode can be “written/visual”, “oral/audio”, and “audio-visual/multi-modal”. Each of them unfolds into numerous subtypes, depending on the chosen media and tools. For example, “written/visual feedback” could be written comments on a paper (e.g. on the task solution/document, separate document/handout/sheet) or shared in a variety of electronic ways, e.g. in an e-mail (text or attachment), chat message (e.g. on learning platform or instant messenger), posting/comment (on social media, blog/e-portfolio, or forum), or in a correction/evaluation software (e.g. autocorrection program, evaluation/assessment software, tutoring software) (for further elaboration see Schluer & Brück-Hübner, 2024, p. 8).

Since the feedback taxonomy also incorporates non-digital feedback methods, it serves as a supplement to the “Digital Feedback Map” (DFM), which is exclusively devoted to digital feedback exchanges (Schluer, 2023a: <https://tinyurl.com/DigitalFeedbackOverview>). On the other hand, the DFM contains more details than the feedback taxonomy, e.g. with regard to videoconference feedback and digital feedback portfolios that were not examined in the reviewed studies by Brück-Hübner and Schluer (2023).

Often, the chosen media, tools and modes affect the manner in which feedback exchanges occur, e.g. whether they can be conducted asynchronously and/or synchronously. Also, some might afford anonymous commenting whereas others do not. Teachers therefore have to carefully consider their affordances and limitations when planning feedback exchanges in the classroom (see also Schluer, 2022). Beyond that, they need to reflect on the impact of the language(s) and (in)directness of the feedback, especially in multilingual or foreign language classrooms. To this end, the screenshot

in Figure 5 lists a few relevant aspects to encourage further reflection by teachers and dialogue with the learners.

Figure 5: Reflective Questions about the Language(s) and (In)directness of Feedback Exchanges



4.6. Questions about Feedback Timing and Frequency

In this category, a major distinction is made between “formative” feedback on the one hand and “summative” feedback on the other hand. Formative feedback means that feedback is provided during a task, e.g. on a draft that learners have submitted, whereas summative feedback is given at the end of a process or task, e.g. during a final class test or course evaluation (e.g. Boraie, 2018, p. 1; see the review by Schluer, 2022, pp. 17–18). Especially the frequency and timing of formative feedback can vary considerably, which in turn will have implications for the learning process and its outcomes. Possible guiding questions included in the web version of the feedback taxonomy are as follows:

- How often is feedback exchanged?
- What might be the optimal timing for feedback, considering factors such as the nature of the task, learner proficiency, and learning objectives?
- Will you combine formative and summative feedback, and if so in what ways?
- What are the advantages of having a time delay, and what are the disadvantages?
- How long is the time delay? What implications does it have?

4.7. Questions about Feedback (Inter)actions

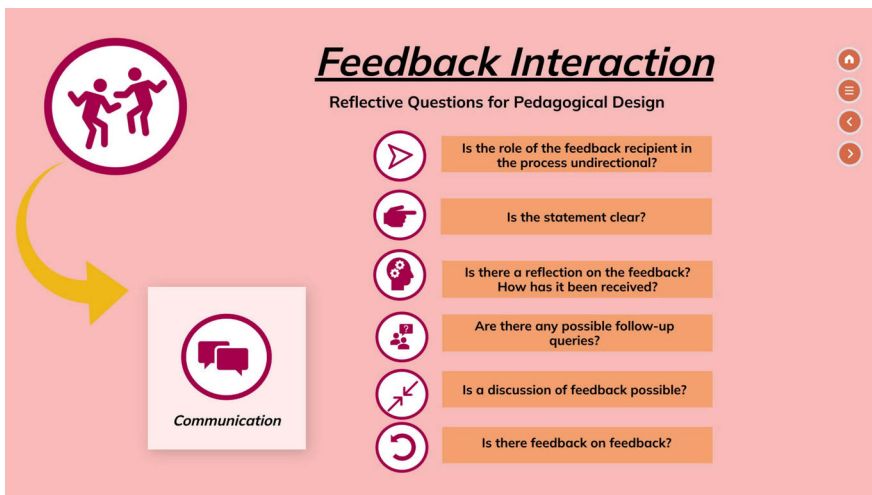
Apart from the feedback event itself, the actions and interactions occurring before or after it hold significant importance in the planning of feedback processes (Schluer & Brück-Hübner, 2024, p. 9). In Brück-Hübner and Schluer’s (2023) review of studies, the category mainly centered on the role of the feedback recipient (“What is the role of the

feedback recipient in the process?”). However, in the web version, the interconnected responsibilities of the feedback providers and recipients are considered, as exemplified by the following reflective questions:

- Initiation phase: To start a feedback dialogue, what are possible ways to request feedback, and from whom?
- Communication phase: During the feedback exchange, how could providers and recipients interact?
- Follow-up/ Revision phase: After the reception of feedback, how could you encourage learners to interact with the feedback and with the feedback provider?
- All phases: How could you support the learners during all these stages? What resources and instructions might be beneficial?

For each phase, there are several options, enabling or restricting possible interactions between feedback providers and recipients. For illustration, Figure 6 gives some food for thought regarding the communication of the feedback.

Figure 6: Reflective Questions for the Communication Phase of Feedback Exchanges



Certainly, different media and tools could be utilized for each phase, which again instantiates the manifold interrelations between the categories. To give an example, portfolio tasks could be seen as “natural sites for feedback dialogues” (Winstone & Carless, 2020, p. 88, based on Esterhazy, & Damşa, 2019), i.e. the communication phase is likely to occupy a central position in the pedagogical feedback design. Further relations are still to be explored, for which the feedback taxonomy might provide inspiration. Possible implications for future research and teaching practice will therefore be discussed next.

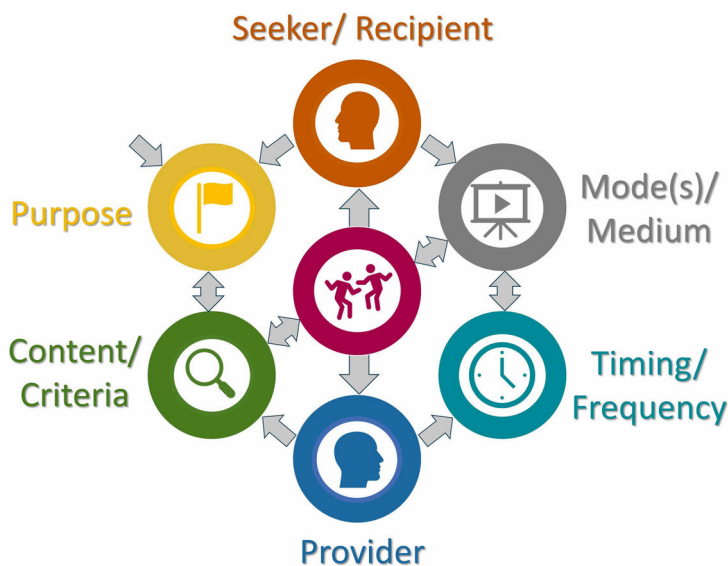
5. Discussion

The foregoing sections have highlighted the importance of pedagogical planning and presented a feedback taxonomy that can assist teachers in that regard. This section will discuss potential uses of the interactive feedback taxonomy in teaching contexts and identify avenues for future research.

5.1. Use of the Interactive Feedback Taxonomy in Teaching Contexts

By consulting the interactive feedback taxonomy, pre- and in-service teachers can gain inspiration and guidance for (re-)designing feedback processes at micro-, meso- and macro-levels. Each of the seven main dimensions can be accessed flexibly, i.e. the above order of questions is by no means binding. As the purpose of the feedback and the learner are considered primary for pedagogical design, educators and (prospective) teachers could start with the feedback purpose and then navigate to the other dimensions (cf. Schluer, 2023b, p. 8). This procedure is visualized in Figure 7.

Figure 7: Feedback Design Cycle



The figure only illustrates some of the manifold interconnections between the different design dimensions that should be considered in the planning of feedback activities. To modify existing feedback designs, it might be sufficient to consult only one dimension and identify alternative options. Quite often, however, changes in one parameter are likely to necessitate adjustments on other dimensions as well. To exemplify, a modification in the medium and (digital) tool might have a direct influence on the feedback timing (on the asynchronous – synchronous continuum) as well as the (possible) interactions of the feedback providers and recipients and could thus require additional training

for them. Therefore, the (possible) impact on other dimensions should be reflected and assessed as part of the entire feedback process.

Crucially, teachers could explore the feedback taxonomy in dialogue with their learners to create more student-centered feedback designs (cf. Winstone & Carless, 2020, p. 175) and prepare them for peer feedback activities. This participatory approach can also help to critically question established modes, instruments and structures of communication by being open to negotiating new norms of interaction (Schluer et al., 2023). In that respect, word choices such as “provide” and “receive” deserve critical reflection, as they might not sufficiently represent the interactive nature of feedback exchanges. Likewise, the feedback taxonomy can help to overcome the exclusive association of feedback with correction, as it raises awareness of the multifaceted purposes feedback can serve. As such, a pedagogically embedded utilization and discussion of the feedback taxonomy could assist (pre-service) teachers in developing novel feedback designs which empower learners and enact a contemporary understanding of feedback as an ongoing dialogue about learning (cf. Winstone & Carless, 2020, p. 175).

In teacher education, the feedback taxonomy can thus be particularly valuable in curriculum planning courses where pre-service teachers learn to design courses, lessons, and tasks. From summer term 2024 onwards, it has therefore been implemented in the TESOL program as part of the “Curriculum Planning & Materials Development” course (see chapter 2 by Schluer in this volume). Also, with its link to the “Digital Feedback Map” (Schluer, 2023a: <https://tinyurl.com/DigitalFeedbackOverview>), the feedback taxonomy appears suitable for the new “Digital Teaching” course (see chapter 2) or any other course in which teacher competencies are to be developed. This certainly applies to professional development workshops as well, which we have started to conduct since summer 2024 (Schluer & Liu, 2024b). Through ongoing dialogue with pre- and in-service teachers, we strive to expand and improve the feedback taxonomy continuously. Consequently, additional subcategories and questions might emerge, which meet learners’ and teachers’ needs and incorporate new developments in society, pedagogy and technology. This, in turn, will have repercussions on the pedagogical design. As Schluer and Liu (2024a) remarked,

“pedagogical designs should be re-shaped, re-aligned and re-negotiated continuously to meet specific learning objectives and learner needs. Due to the emergent and situated nature of feedback processes, also feedback literacies need to be developed dynamically (see Schluer 2022a: 238–250 on “dynamic digital feedback literacies”) and practiced continuously (Tai et al. 2021: 10).” (Schluer & Liu, 2024a, p. 143)

Resonating with Kaya-Capocci et al.’s (2022) idea, the feedback taxonomy can thus “be used as a reflective device as well as a forward planning tool” to improve feedback practices and find inefficiencies in existing pedagogical designs (p. 8).

5.2. Suggestions for Future Research

In its present form, the interactive feedback taxonomy is largely based on Brück-Hübner and Schluer’s (2023) as well as Schluer and Brück-Hübner’s (2024) scoping review of

intervention studies conducted in higher education. As the publication period of the reviewed studies stretched from 01/2018 and 07/2022, the initial version did not yet include recent developments in a detailed manner, notably with regard to videoconference feedback and AI. It has therefore been expanded in the online version (Schluer, 2024; available at <https://tinyurl.com/FeedbackTaxonomyEN>). The interactive feedback taxonomy is to be understood as constantly evolving, based on its practical implementation in teacher education seminars and in-service teachers' professional workshops. Crucially, the usefulness of the feedback taxonomy still needs to be tested in these contexts. Moreover, research could be conducted with teachers who are using the feedback taxonomy for course design in their unique educational contexts. Such studies would provide insights into the usefulness of the feedback taxonomy and might uncover existing gaps.

Another area requiring further investigation and elaboration relates to multi-staged and iterative feedback designs at micro-, meso- and macro-levels, i.e. in individual tasks, courses and modules or entire degree programs (see Boud & Dawson, 2023). Indeed, most feedback designs contain a combination of several possible feedback directions, modes, and purposes etc. In that respect, it seems sensible to develop "a series of overlapping, interlinked or integrated tasks; or iterative sequences in which feedback from an earlier task can be applied to a later one" (Winstone & Carless, 2020, p. 79). Connectivity within a lesson, course or degree program is consequently central to feedback designs (Winstone & Carless, 2020, p. 168). Such designs can ultimately boost students' motivation and uptake as they recognize the value of engaging with the feedback (cf. Zimbardi, et al., 2017, cited by Winstone & Carless, 2020, p. 88). Hence, the seventh dimension of feedback interactions that precede and follow a feedback event deserves further attention in research and practice.

As variations in pedagogical design can affect the learning success and thus also the results of empirical studies, a clear description of the single steps and elements is pivotal to enhance the transparency and thus replicability and comparability of intervention studies. In that regard, the multidimensional feedback taxonomy assists researchers in crafting detailed descriptions of the feedback scenarios that they utilize in their studies (Brück-Hübner & Schluer, 2023, pp. 146–147). It may thus help overcome the vagueness in descriptive detail that was observed in several published studies (cf. Alqassab et al., 2023; Brück-Hübner & Schluer, 2023).

6. Conclusion

In the feedback literature, teachers are increasingly recognized as designers of learning environments that encourage learners' active engagement (Boud & Dawson, 2023; Carless, 2022; Carless & Winstone, 2023). Accordingly, adequate task and curriculum design turn into key factors for promoting student learning (cf. Boud & Dawson, 2023, p. 159; Winstone et al., 2017, p. 24). While there are several practical suggestions for feedback designs (e.g. in the book by Winstone & Carless, 2020), teachers might not readily be able to translate them into their own teaching context. The current chapter has therefore presented an interactive feedback taxonomy that was derived from a qualitative scoping review of 135 empirical studies (Brück-Hübner & Schluer, 2023; Schluer & Brück-Hüb-

ner, 2024) and expanded through pertinent literature and practical insights from teacher education. The seven main categories and their numerous subdimensions were transformed into guiding questions that seek to inspire pre- and in-service teachers in the pedagogical planning process. By exploring the diverse design options, (student) teachers can create or modify feedback activities for specific learning environments. The feedback taxonomy not only assists in refining feedback approaches at the micro- and meso-levels of individual tasks or courses but can also contribute to curricular changes at the macro-level of degree programs. Whether consulted individually or integrated into curriculum planning courses or professional development workshops, the taxonomy may provide a framework for enhancing pedagogical feedback designs at various levels. To cultivate a learner-centered dialogue, teachers should be responsive to students' needs (see chapter 5 by Brück-Hübner in this volume) and consider feedback not as something "done to" the students (Winstone & Carless, 2020, p. 21), but as a process that is actively shaped "together with" the students. In that respect, it is hoped that the suggested taxonomy will inspire educators to explore various design options to improve feedback processes and learning outcomes.

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Section III:

Learner Engagement and Teachers' Roles in Feedback Processes

Needs-based Feedback? – The Role of Students in (Digital) Feedback Processes in Higher Education

Annika Brück-Hübner

Abstract *Feedback processes are central to learning but not every feedback process is equally beneficial. Even though there is a growing number of criteria catalogs for “good feedback”, these reach their limits in practice. One of the reasons for this is that there are many different understandings of feedback and that very different goals can be pursued with feedback processes. We might hypothesize that the characterization of good feedback is closely linked to the understanding and goal of feedback. This paper is based on an understanding of feedback that places the student at the center. Accordingly, the goal of the feedback process is to support students in their learning and professionalization processes. Based on an interactional-constructivist understanding of learning, it is argued that students should take a central – active – role in feedback processes and that feedback can only be successful if students are open for feedback and not only understand and comprehend it but are also willing and able to transfer it to future situations and to change their learning behavior. Starting from this hypothesis, a model of feedback communication processes is presented, which foregrounds the role of students in feedback processes from a constructivist view. These theoretical assumptions are contrasted with the results of a questionnaire study conducted in 2021, which analyzed the role students play in feedback processes from their own perspective. The comparison of theory and practice shows that students still see themselves primarily in a passive role in feedback processes. Implications are given for how feedback practices need to change. In addition, limitations and research perspectives are pointed out.*

Keywords *feedback; higher education; constructivism; student needs; student role*

1. Introduction

Feedback processes are central to learning. Many studies demonstrate the positive impact of feedback on learning, performance, and learner motivation (Bauer & Knauf, 2018; Boud, 2000; Hattie, 2009, pp. 173–178; Jurs & Spehte, 2021). Furthermore, feedback is seen as a central factor in fostering student autonomy and self-directed learning (Nicol, 2013, p. 34; Nicol & Macfarlane-Dick, 2006, p. 199). But feedback can also have negative

effects on learning and performance (e.g. Kluger & DeNisi, 1996) and is not always perceived as positive and helpful by students (e.g. Carless, 2006; Sadler, 2010). For this reason, it is not surprising that the question “What is good feedback?” plays a central role in the (higher education) didactic discussion. Numerous criteria are mentioned in the research literature (see e.g. Brück-Hübner, 2023; Henderson et al., 2019; Howard, 1987). Price et al. (2010, p. 287) state in this regard that feedback is a very complex process that is influenced by numerous factors. And even if all the criteria for good feedback are met, this is no guarantee that feedback will lead to the desired success (see, e.g., Brück-Hübner, 2023).

In view of the diversity of feedback and practice in the research literature, it is not surprising that criteria catalogs are of limited use. Feedback is a very complex concept and thus feedback practices can differ in multiple ways. Every feedback situation is unique and made up of numerous factors (see chapter 4 by Schluer in this volume). For this reason, it seems almost impossible to develop criteria that apply equally to all feedback situations (see e.g. Brück-Hübner & Schluer, 2023; Schluer & Brück-Hübner, 2024). One key element, where feedback situations may differ, is the goal that is pursued by the feedback process. When lecturers give feedback to students, they often aim to support learning processes and thus make a positive contribution to the students' professionalization. Apart from that, feedback processes can also have other goals, such as providing a reason and explanation for how a specific grade came about. Depending on the goal pursued, the requirements placed on a feedback process may differ. As a result, the question as to when feedback can be considered “successful” is linked to the definition as well as to the objectives of the feedback process.

When talking about “feedback”, it is therefore important to specify which understanding it is based on and which goal is being pursued with it. This article is explicitly limited to the feedback processes that aim to initiate learning processes on the part of students and which support their professionalization processes. In this sense, feedback is understood as a (reciprocal) communication process about learning (process and/or product) between a lecturer and a student that refers to competencies and skills and aims at the professionalization of the students. Feedback processes can therefore be considered successful if they have a positive effect on the students, in the sense that they support learning processes and their professionalization.

This article argues that when considering feedback as part of learning processes, learning theories can help to find indicators of “successful” feedback processes. Referring to constructivist learning theory, the main aim of this article is to take a closer look at the role of learners in feedback processes and to critically contrast the “desired” and “actual” conditions in contrasting theory and practice.

This chapter analyzes criteria for successful feedback processes based on the theory of “Interactive Constructivism”. Using this framework, a four-phase model of feedback processes is developed, in which the role of students in feedback processes is elaborated. Subsequently, the results of an empirical study analyzing students' self-perceptions of their role in feedback processes are presented and discussed in relation to the theoretical considerations. From this, implications for practice are derived. The paper concludes with a brief summary and outlook after discussing the study's limitations and providing suggestions for further research.

2. Interactive Constructivism and Feedback

Today, a variety of learning theories exist. In recent decades, the constructivist view of teaching and learning has gained in importance. There is a plurality of constructivist perspectives in the discussion of educational science, which have been shaped by numerous lines of discussion (e.g., cybernetics, systems theory, pragmatism, neurobiology, sociology, psychology, culturalism) (Hug, 2011, p. 467; Reich, 2007, pp. 8–9). One theory that has had a significant impact on the constructivist discussion in Germany in recent years is Kersten Reich's "interactive constructivism", which brings together numerous theories from philosophy, psychology, communication theory and education (for further information see e.g., Reich, 2007, 2010). The special characteristic of Reich's constructivist theory is its emphasis on the cultural imprint of interaction processes – and thus of communication and construction processes. Reich (2007, pp. 8, 11) notes that the demands of a changing, dynamic, pluralistic, and post-traditional world in which we live today are different from those of earlier times. Therefore, it is also important today to reflect on the broader cultural conditions and contexts of learning.

According to Reich (2007, p. 23; 2010, pp. 119–122), learning is the subjective construction of reality and takes place in an interplay between processes of construction (subjective construction of reality), reconstruction (cultural reproduction), and deconstruction (critical perspectives on omissions in versions of reality). He also emphasizes that knowledge, in the constructivist sense, cannot simply be transferred from one person to another. Rather, it requires the negotiation of meaning as well as social conditioning structures. In addition, knowledge is understood as a viable subjective construction that is directly related to previous knowledge and experience and thus cannot claim absolute validity. As a result, knowledge cannot simply be transferred from one person to another: Learning is an activity of the learner ("learning by doing"), which always takes place in a (culturally shaped) context. Consequently, learning and teaching processes must be designed in such a way that they support the freedom and participation of learners and take individual (social and cultural) conditions into account. However, learning is not only an individual process, but also a social process. Teachers should not only be supportive, but also consider (social and cultural) differences and reflect on culture, visions and expectations. Furthermore, Reich emphasizes that it is an illusion to assume that there is such a thing as "complete understanding" in the context of communication processes. Communication partners must therefore accept and reflect on the limits of mutual understanding (Reich, 2007, p. 21).

These basic assumptions can also be found in the discussion of feedback in higher education. Here, there has been a shift from feedback transmission to a greater focus on the students' role in the feedback process. Although much of the research still assigns a rather limited role to students, there is a growing body of research highlighting the centrality of the learner in feedback processes (e.g. Carless, 2022; van der Kleij et al., 2019, p. 319). Feedback is no longer seen as something that is delivered to students; instead, students are seen as active and co-constructing feedback partners. Consequently, feedback processes are conceptualized dialogically with the aim of constructing shared understandings and supporting students' active engagement with feedback. While students have been described as active agents and feedback seekers who are also invited to criticize,

deconstruct, or reject feedback, lecturers are regarded as designers of supportive feedback environments and as supporters who train students in giving and using (received) feedback (van der Kleij et al., 2019, pp. 317–319).

Such a perspective on feedback processes is consistent with constructivist learning theories. If feedback is to promote change and learning, it must be understood as a co-constructive process of communication and negotiation. Even if there is no such thing as “full understanding”, it is important to build common constructions together. However, constructivism particularly emphasizes the active role of the learner in feedback processes. As mentioned above, learning is an activity of the learner and can be facilitated and supported by others, but there is no causality between learning and instruction/feedback. Applied to feedback processes, this means that success or failure depends largely on the person seeking and receiving the feedback. In addition to active participation in the communication process, students need to engage in internal processing. They need to process external information into “internal feedback” because only when the personal meaning is recognized can change processes be initiated (Carless, 2020; Nicol, 2019).

The following three hypotheses can be derived from the previous remarks:

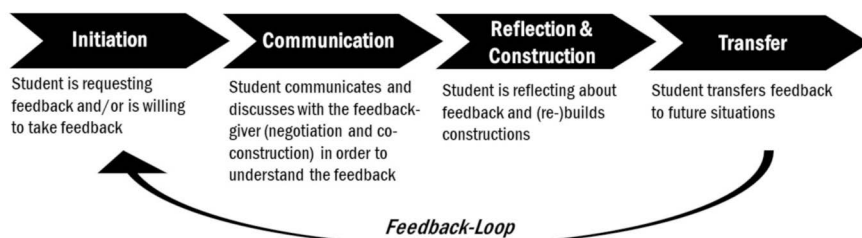
- (1) If a student does not want to learn (from the feedback giver), and therefore is not interested in receiving feedback, the feedback process will inevitably come to nothing.
- (2) Feedback must be exchanged in such a way that the latter understands its meaning as intended. This requires processes of co-construction and negotiation (= communication).
- (3) If feedback is to bring about change, then it requires appropriate cognitive reconstructions, new constructions, or even the discarding of knowledge, beliefs or strategies that are considered “good” (deconstruction) on the part of the student. Such changes are an essential prerequisite for achieving behavioral change and putting feedback into practice (transfer).

These remarks emphasize the importance of the student in feedback processes and underscore the argument that feedback is successful only if the student understands and comprehends it (reconstruction), is also willing and able to transfer it to future situations and to adjust his or her learning.

3. Four Phases of Feedback Processes

When we look at feedback processes with constructivism in our mind, we can see that there are different phases in feedback processes: (1) the initiation phase, (2) the communication phase, (3) the phase of reflection and construction, and (4) the transfer phase (see Figure 1).

Figure 1: The Four Phases of Feedback Processes (Own Illustration)



In the *initiation phase*, the first question is who or what initiates the feedback process. According to constructivism, ideally it should be the learner. If the instructor initiates the feedback process, it is crucial that the student is willing to engage in the feedback process.

The *communication phase* is where the feedback process itself takes place. Through mutual exchange and negotiation processes, it is important to ensure that the student understands and can reconstruct the feedback.

In the *phase of reflection and construction*, students must reflect on the feedback and actively integrate it with their prior knowledge through re-, de- and new constructions. This is a prerequisite for drawing real consequences from the feedback process and putting them into practice.

Finally, in the *transfer phase*, students need to take action and transfer the conclusions drawn from the feedback processes into practice. This requires situations that are similar to the situation to which the feedback was related. Ideally, feedback should take place in a loop (Carless, 2019). This means that the feedback process starts again based on the transfer situation.

This four-phase model describes the presumably ideal path of feedback processes that has been derived from the theoretical foundations in section 2. Feedback is understood here as a process that requires an active student role in all four phases. Of course, it must be kept in mind that the model is based on numerous propositions and needs further empirical verification. At the same time, however, it provides a good basis for analyzing current feedback practices with respect to the role of students in feedback processes.

4. The Student Survey – Research Questions, Methods and Sample

4.1. Research Questions and Objectives

The research project “Digital Feedback in Higher Education”, carried out at Justus Liebig University Giessen in Germany from 2022 to 2023, investigated the opportunities, challenges and limitations of digital feedback processes in higher education from the perspective of students. By means of an online survey, it was examined how feedback was enacted during the digital (Corona) semesters, and what was perceived as good and bad digital feedback. The analysis will lead to a discussion of the consequences that can be

drawn from this for the future design of digital feedback cultures in higher education. The article focuses on the question of what role students ascribe to themselves as well as to the lecturers in feedback processes, and what needs to be changed.

4.2. Methods

A partially standardized questionnaire was designed and used for data collection. In addition to selected closed questions, special emphasis was placed on the integration of open questions in order to capture the different feedback practices and experiences as diversely as possible.

The closed questions were analyzed using descriptive-statistical methods. The qualitative data were analyzed using qualitative content analysis (adapted from Gläser & Laudel, 2010; Kuckartz, 2016). The formation of the main categories was initially deductive, based on the principles of interactive constructivism (see section 2) and the assumptions about the different phases of feedback processes (see section 3). In addition, an inductive extension of the material took place. In a second step, subcategories were formed on the material itself. Finally, the entire material was coded on the basis of the (sub)category system. A text passage was counted as a coding unit if its content related to one of the main thematic categories and if it was self-contained (sense unit). A single student comment could consist of several different coding units. Thus, if a text passage addressed multiple themes, it was assigned to multiple major categories. Irrelevant passages were not coded (Kuckartz, 2016, pp. 41, 102–104). Finally, the influence of individual characteristics was quantified by means of a descriptive-statistical evaluation.

4.3. Sample

The survey was distributed to students at universities or universities of applied sciences who had studied predominantly digitally for at least one semester (Corona semester). In addition to a circular email sent via a mailing list at the Justus Liebig University Giessen, letters were sent to student councils at other universities and universities of applied sciences, advertisements were placed on social media, and specific requests were made to university lecturers in the researcher's own network. From April to May 2022, 385 students participated in the survey, with a total of 204 (53%) questionnaires having been completed.

65.6% of the participants were students of the Justus-Liebig-University Giessen, 4% were students of the Philipps-University Marburg and the rest were spread over 41 other universities. In total, 90.6% of the participants were enrolled at universities and 9.4% at universities of applied sciences.

The distribution of students by subject was as follows: Education (36.6%), Psychology (17%), Economics (12.4%), Natural Sciences (11.9%), Medicine (8.8%), Cultural Studies (6.2%), Law (3.1%), Social Sciences (2.1%), and Engineering (1.5%).

5. Results

This section summarizes the key findings of the empirical study by focusing on the analysis of the students' views on learner and lecturer roles during the phases of feedback initiation and feedback communication (see section 3).

5.1. Attitudes of Students towards Feedback and Feedback Initiation

Based on a constructivist understanding of feedback processes, the fundamental willingness of students to receive and engage with feedback is essential. But what does the student survey data show us about student attitudes toward feedback?

The results of the responses to the closed questions (see Table 1) show that with 73%, the majority of students find lecturer feedback important. Only 17% of the student's state that they are not interested in lecturer feedback. 71% of students say feedback helps them improve their learning. With 54%, slightly more than half of students would like more feedback from their instructors. In contrast, only 19% of students state that they actively ask lecturers for feedback.

Table 1: Attitudes of Students Towards Feedback and Feedback Initiation (N=284)

To what extent do you agree with the following statements?	Agree	Rather agree	Partly agree	Rather not agree	Not agree
Lecturer feedback is important to me.	36 %	37%	20%	7%	1%
I am not interested in feedback from lecturers.	7%	10%	13%	22%	48%
Lecturer feedback helps me to improve my learning.	38%	33%	20%	7%	1%
I would like to get more feedback from lecturers.	26%	28%	30%	8%	8%
I actively seek feedback from my instructors (e.g., by voluntarily signing up for office hours).	6%	13%	25%	34%	21%

But what do students' responses to the open questions tell us about the initiation phase of feedback, as well as the role students assign to themselves? Students were asked to describe one feedback situation they found particularly positive and one they found particularly negative. Only 25% of the 181 positive and 168 negative feedback situations described by the students allowed to draw conclusions about who initiated the feedback process. Nevertheless, the analysis revealed five different variants of feedback initiation:

(1) Students expect lecturers to give feedback, but do not receive any.

Situations in which lecturers were expected to give feedback (even without explicit request) were experienced as negative by 21 students (12.5% of negative feedback situations), e.g.:

“It was especially negative whenever there was almost no feedback, or when I would have had to actively seek feedback.”¹ (S397, Description of a negative feedback experience).

(2) Lecturers give feedback without request.

Regarding the question about particularly positive feedback experiences, 28 students (15.5% of positive feedback situations) explicitly reported about situations in which they received feedback from the lecturer unexpectedly, e.g.:

“After submitting a term paper [...], I received very helpful feedback by mail unexpectedly [...].” (S257, Description of a positive feedback experience)

Apart from those 28 students who perceived unexpectedly received feedback as positive, there were two students (1% of positive feedback situations) who mentioned that they liked feedback via mail because by that they can decide on their own whether they read it or not, e.g.:

“[I like] Email [feedback] – because you can read the feedback on your own or not” (S86, Description of a positive feedback experience)

This example is supporting the claim that feedback can only result in a change when the student is willing to take it.

(3) Students request feedback but get no response.

Nine students (5.4% of negative feedback situations) reported negative feedback experiences in which they actively requested feedback from instructors but received no response, e.g.:

“[...] I had many questions, I wanted to seek the conversation with my lecturer. I contacted him several times by mail, as this was the only way I could get it from him. However, he did not respond to these mails at all and did not help me [...].” (S125, Description of a negative feedback experience)

1 All student quotes were originally written in German and translated into English by the author.

(4) Students request feedback and get a less useful feedback response.

Nine students (5.4% of negative feedback situations), in describing a negative feedback process, reported that they had asked for feedback and received a response, but that the response was not helpful (for a variety of reasons), e.g.:

“It was negative for me when I had to email multiple times to get a single evasive response to questions.” (S158, Description of negative feedback experience)

(5) Students request feedback and get a useful feedback response.

Overall, 20 students (11% of positive feedback situations) reported positively about receiving useful and helpful answers to feedback requests from their lecturers, e.g.:

“I got a quick response from a lecturer. I asked him about an idea, and he even gave me suggestions for improvement.” (S13, Description of a positive feedback experience)

The analysis shows that these five different forms of feedback initiation are all directly related to a positive or negative evaluation on the part of the students. While students evaluate it positively when they receive feedback unexpectedly from instructors and when they receive helpful responses to requested feedback, they report negatively when instructors do not give feedback by their own initiative, when students receive no response or an unhelpful response to their active request for feedback. A look at the frequency of each feedback initiator group, lecturers (56%) and students (44%), shows that these were relatively evenly distributed in the coded responses. Based on these data, it could be concluded that feedback initiation is relatively equally distributed between students and faculty in practice. However, since students were only allowed to pick one particularly positive and negative situation each, this quantitative number can by no means be considered as representative of the real distribution of feedback initiators, especially because only 25% of the overall answers of students allowed an explicit conclusion about the person who initiated the feedback.

5.1. Feedback Communication and Understanding

Based on a constructivist understanding, successful feedback processes require that (reciprocal) communication processes take place: Discussions, negotiation processes, co-constructions and the effort for mutual understanding are central so that the feedback recipients understand the feedback as intended by the feedback sender. But how important is communication and mutual understanding in feedback processes for students?

37% of the students (rather) agreed to the statement “It is important to me to explain my personal point of view to the lecturer in the context of feedback discussions”, while 36% agreed only partially. For 27% of the students, it is (rather) not important to bring in their own point of view into feedback processes.

An analysis of the description of the feedback processes perceived positively by the students shows that 32% of the students described situations in which they were given the chance to ask their own questions (e.g., "I wrote an email with two questions and the lecturer offered me a personal meeting via video conference." (S145)). In addition, 29% of the students mentioned that they perceived dialogical and personal exchanges as positive – especially when media were used through which they could also see the lecturer (8%) (e.g., "I perceived this feedback process as positive, because you could talk directly with the lecturer (and at the same time also saw each other)" (S209)). 8% also assessed it as positive when they had the chance to describe their own perspective (e.g., "we could also actively participate in the conversation and say if something bothered us" (S39)). Overall, therefore, about one third of the students described situations in which they took at least a partially active role (see Table 2).

Table 2: Analysis of the Positive and Negative Feedback Situations Described by Students Related to Student and Lecturer Roles (N= 111²)

Positive Feedback Experience	Negative Feedback Experience
Student Role	
Chance to ask questions (32%)	Asking questions is not desired/possible (6%)
Explain own perspective (8%)	Get suppressed / No chance to clarify misunderstandings (7%)
Chance of self-evaluation (2%)	
Student and Lecturer Roles	
Dialogical/ Personal exchange (29%)	No feedback (41%)
"Can see each other" (8%)	"Not seeing each other" (2%)
Informal exchange (3%)	No personal exchange (6%)
	Have technical issues (2%)
Lecturer Role	
Give elaborated/ detailed feedback (32%)	Give standardized/ vague feedback (19%)
Praise students; name strengths (26%)	Give no elaborated/ detailed feedback (14%)
Give a quick response (response time) (20%)	Give not reasonable and traceable feedback (10%)
Give specific suggestions for improvement (tips) (17%)	Give no specific suggestions for improvement (tips) (6%)
Take time (16%)	No immediacy of communication (long response time) (6%)

2 Only those comments were counted that involved any information related to the student and lecturer role.

Positive Feedback Experience	Negative Feedback Experience
Appreciate students/ Do a conversation at “eye level” (16%)	Give feedback in a public setting (5%)
Give reasonable and traceable feedback (13%)	Give feedback that is hard to understand (4%)
Give formative / frequent feedback (10%)	Give spontaneous feedback (without preparation) (1%)
Give accurate / individual feedback (10%)	
Give suggestions for thought/ help for self-help (3%)	

When looking at the descriptions that contained information about the lecturer role in positive feedback situations, we note that there are many content-related criteria the students adduce, such as “give elaborated/detailed feedback” (32%) and “give specific suggestions for improvement” (20%) (e.g. “I had a super nice, detailed conversation with the lecturer. He explained to me what went wrong and how I could do it better.” (S118)) or “give reasonable and traceable feedback” (13%) (e.g. “[...] feedback directly on assignments [...] helped me a lot to be able to see directly what was not yet so good and what was. In an email it is always very general, but here you could see it concretely.” (S172)) (see Table 2). These criteria suggest a need of those students to receive feedback that they understand and from which they can derive consequences for action.

The description of the student and lecturer roles in the context of the feedback processes perceived as negative are content-wise consistent with the roles derived from the positive feedback situations. However, the category “give and receive no feedback” needs to be added, which was named by a total of 45 students.

Overall, quantitative as well as qualitative data suggest that approximately only one third of the students see themselves in an active role during feedback processes. However, a discussion of the feedback as well as associated processes of co-construction and negotiation seem to be of minor importance for the majority of students.

5.2. Summary

The quantitative findings related to the feedback initiation phase suggest that a large proportion of students are interested in feedback, but at the same time it can also be concluded that students played a primarily passive role in the initiation phase. The qualitative results illustrate that many students expect to receive feedback from their lecturers and consider it negative if this does not happen.

On the other hand, there are students who do not expect any feedback at all but are happy to receive it. In addition, the reports by students who received no or no helpful response to a specific feedback request show that feedback requests from students are not always answered (in a needs-oriented manner) by the lecturers. This refers to the communication process that immediately follows the initiation phase. In that regard, quantitative as well as qualitative data suggest that approximately only one third of the students

see themselves in an active role during the feedback communication processes – mainly in being able to ask their own questions. However, active discussion of the feedback and related processes of co-construction and negotiation seem to be of minor importance for most students.

6. Discussion of the Results and Implications for Feedback Practice

Based on interactive constructivism, activity plays a central role in feedback processes. While the initiation phase is about students being open to feedback or, in the best case, even specifically asking for it, the communication phase is primarily about ensuring that the feedback content has been understood and also accepted – especially in the case of different perspectives. These processes of co-construction and negotiation are central for the following steps of individual reflection and construction as well as for transfer. However, the present study reveals a gap between theory and practice: A large part of the students see themselves in a rather passive role in the context of feedback processes.

These findings are not surprising, as the shift from a more instructor-centered to a student-centered perspective of feedback has only been discussed more extensively in recent years (see section 2). It is no secret that learning cultures – and thus also feedback cultures – have evolved in long-established practices and are very slow to change. A change of feedback cultures requires a rethinking of the actors involved – lecturers and students – as well as their capacity and willingness of changing their roles. For this to be implemented, lecturers as well as students need appropriate training, support and guidance. There is a need for the development of shared teacher and student feedback literacy (Brück-Hübner, 2020, pp. 25–39; Carless, 2020, pp. 150–151; Winstone & Carless, 2020).

Another element that the present study illustrates is that there are different ideas on the part of the students as to what constitutes “good” feedback and what goal is pursued with it (see section 7). The wishes and needs expressed by the students regarding feedback processes differ. With reference to interactive constructivism, it can be assumed that feedback processes are only productive and successful if students recognize their added value for themselves and perceive it as positive, i.e. feedback should be needs-oriented. This importance of the needs-orientation of feedback has also become clear in the context of the study, in that the possibility of being allowed to ask questions (and thus also to express one’s own needs) was mentioned most frequently by the students. However, needs-based feedback also means that feedback should only be given when it meets a student’s need. Otherwise, it can be assumed that the feedback will not be heard anyway and will thus turn out to be redundant. This is also evidenced by some student statements, e.g., in the statements referring to the possibility of simply not reading feedback (see section 5.1). However, lecturers could only learn about students’ needs if they openly communicate with them about them. Again, this emphasizes the need for student activity – especially in the initiation phase itself.

At the same time, the study showed that unsolicited lecturer feedback can also have positive effects on students and their learning. Some students described positive feedback situations in which they experienced unexpected lecturer feedback as constructive and, above all, motivating. On the other hand, there are also students who complained

about a lack of feedback or feedback on demand only. Regarding the latter, it can be assumed that some students might find it difficult to actively ask for feedback out of personal reasons (e.g., being shy or afraid). It can be deduced from this that the exclusive reduction of feedback to student-initiated processes is therefore not the optimal solution neither. However, even if lecturers actively reach out to students to provide feedback, students should not only be given the opportunity, but more importantly, be encouraged to express their needs during the feedback process. And furthermore, the feedback processes – depending on the needs of the students – should also be designed differently, individually adapted to the student (see Boud & Molloy, 2013, pp. 205–206).

The latter is also supported by the study data, as standardized and non-personalized feedback is the second most frequently described characteristic of feedback situations that are perceived as negative by students (19%). From the lens of interactive constructivism, it is also important to take cultural differences into account, even if this was not specifically named by students in the collected data (see Paul et al., 2013).

For students to be able to express their needs openly, however, there also needs to be an appropriate climate for discussion. 16% of the reported feedback situations included aspects related to the way of communication (e.g., the appreciation of each other, communication at eye level). Communication in this way plays a central role in the role change and the accompanying change in hierarchical relationships in the context of feedback processes. Especially in view of the subjectivity of feedback processes – which interactive constructivism again strongly emphasizes – such negotiation processes are essential. It is important for lecturers to recognize that they can only provide their subjective viewpoint and that learners are experts for their own learning processes, with potentially different viewpoints and opinions.

7. Limitations and Ideas for Further Research

The study focused primarily on the various forms of digital feedback during the Corona pandemic. Even though the survey questions did not explicitly ask students to specify a date in their reports, it can be assumed that most students primarily referred to experiences gained during the digital semesters, as the survey took place in 2022. Clearly, the results cannot simply be transferred to feedback experiences and situations in face-to-face semesters, so their significance and transferability is limited.

Also, the study is only based on self-reports by students. Price et al. (2010, p. 286) emphasize that it is very easy for students to assess the service of giving feedback (e.g., frequency, amount, availability, etc.). However, it becomes much more difficult when it comes to assessing the long-term impact of feedback processes on students' learning. Moreover, the understanding of good feedback may well differ between different groups of students and lecturers (Esterhazy et al., 2020). Especially regarding their role perceptions, a comparison with the experiences and views of lecturers would certainly be profitable and could contribute to a validation of the conclusions drawn from the analyses. To complement this, an empirical investigation of the communication processes themselves (e.g., through interactional analysis (Ajjawi & Boud, 2017)) could also provide

further insights into current feedback practices and could help to better understand the roles within feedback processes.

Furthermore, it is important to mention that this study concentrated on students' perspectives regarding the initiation and communication phases of feedback processes. The other phases were not included. Here, too, further research is needed to shed more light on the particularities and also the interrelationships of the various phases.

With regard to the survey design, the questionnaire study contained qualitative as well as quantitative parts. While the sample size was comparatively large for a qualitative study, the quantitative sample was rather small, so the results might not be representative. Due to the explorative nature of the research, however, this is of minor importance. Based on the results, a standardized and more comprehensive questionnaire could be developed.

The results of the qualitative analysis also bear limitations. On the one hand, the students were asked to describe only one situation that they found particularly positive and one that they found particularly negative. The evaluation and selection of the respective situations cannot be considered as representative, since it only expresses the students' personal feelings about the feedback situations that came into their mind when they completed the survey.

Individual ideas about what exactly the respective students understand by "good" feedback also play a central role. Students' reports of positive and negative feedback experiences make it clear that feedback can pursue very different goals. It is not always about promoting learning and competence development in the long term and thus contributing to professionalization. In many cases, feedback was also directly linked to performance evaluation issues. Thus, (formative) feedback partly served to ensure that work could be adjusted according to the expectations of the lecturer so that this would result in a better grade, e.g.:

"Before the presentation, we sent the presentation to the lecturer, who then gave us feedback in a video call so that we could adjust these points before giving the presentation. This was very helpful to understand which topics were particularly important to her." (S149, Description of a positive feedback experience)

Other feedback was also used to better understand the grade given or to better assess one's own level of performance, e.g.:

"In Greek, my lecturer corrected the homework I handed in and thus pointed out my mistakes as well as praised my good submissions. This helped me to better assess my level of performance." (S168, Description of a positive feedback experience)

As a result, different understandings of feedback become apparent. These range from the justification of a grade to corrections to the support of professionalization processes. This result is also consistent with the findings of recent reviews in which different understandings of feedback and student roles were discussed (e.g. Brück-Hübner & Schluer, 2023; Schluer & Brück-Hübner, 2024; van der Kleij et al., 2019). It is therefore always a question of what exactly is intended with feedback. The explanations about construc-

tivism foreground an understanding of feedback that aims at long-term learning and competence development in the sense of professionalization processes. Possible other forms of feedback might be better suited to increase the motivation of the learners or to improve (end-)products. However, these differences were not considered in the analysis and further research is needed.

8. Conclusion and Outlook

The theory of interactive constructivism helps us to think about feedback processes in a more student-centered way and at the same time illustrates the importance of students' active participation in feedback processes if they are to lead to long-term learning growth and competence development. The study presented in this article provides initial indications that students currently still tend to take an overly passive role (e.g. van der Kleij et al., 2019; Brück-Hübner & Schluer, 2023). It can be concluded that we need to rethink feedback processes: On the one hand, feedback would need to be more detached from the context of performance assessment, and on the other hand, students would need to be more encouraged to participate actively, e.g. by asking for feedback and discussing it with their instructors. Communication and negotiation processes are essential, especially when students' opinions differ from those of the instructors. However, this goes hand in hand with a changed understanding of roles and hierarchies and therefore requires above all a willingness on the part of lecturers to talk to students at eye level and to be open to other perspectives (see also Tai et al., 2023, p. 210). Likewise, it presupposes willingness on the part of students to be more actively involved in feedback processes.

Although research has focused on a more active student role in recent years, more work is needed in this area. In particular, conclusions derived from studies, such as the one presented in this article, need to be translated into pedagogical concepts and tested in practice, e.g. in the form of implementation studies. In addition to the changed roles and the associated challenges, the impact of new feedback cultures on students' long-term learning should be investigated.

Given the importance of feedback for learning and workload considerations by instructors (and students), it is important to use feedback processes as efficiently and purposefully as possible while minimizing feedback processes that do not serve to achieve their goals or that end up going nowhere. For this reason, the needs of the learner should be the starting point for any feedback process.

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From Passive to Active Learners: Using Audience Response Systems to Foster Motivation and Participation in the Classroom

Anna-Katharina Scholz

Abstract Audience Response Systems (ARS) enable direct interaction between a speaker and the audience through live polling. Audience members simply use their electronic devices (e.g. smartphones, tablets or laptops) to answer a question the presenter poses, and the results are instantly available. They can be presented to everyone in real time. As such, ARS are particularly well-suited for use in the classroom as they offer a variety of ways to actively engage students in their learning, such as quizzes, brainstorming activities or sharing the results of group work. This paper describes how I integrate ARS tools into my teaching practice with students enrolled in the B.A. and M.A. English Studies programs at Chemnitz University of Technology. It shows different ways of using ARS for direct and immediate feedback, which helps to engage and motivate students. Furthermore, it details the students' feedback on using ARS in my classes. I hope this report serves as a source of ideas for other lecturers who are looking for ways to actively engage their students, as well as for researchers interested in feedback and student engagement.

Keywords Audience Response Systems (ARS); digital feedback methods; active learning; student engagement; blended learning

1. Introduction

During the pandemic, most teaching took place online for quite some time. Consequently, lecturers had to find new and innovative ways of engaging their students in online classes due to the circumstances and the changed teaching context to which neither lecturers nor students felt prepared. Video conference tools opened new ways of engaging students, e.g. by including options for live polls or digital whiteboards. The significant advantage was that the answers and results could easily be stored and shared afterwards. Additionally, these ways of engaging students turned out to be quite successful; they motivated students to actively participate in class, even those who usually tend to be quieter in classroom settings.

But upon return to on-site teaching, I asked myself how this interaction and student engagement could be continued and secured. In this context, I learned about Audience Response Systems (ARS) and started to use them in my classes in various ways. They have become an integral part of my regular teaching. The result is a digitally enhanced classroom in which students are actively engaged in their learning and motivated to participate in classroom activities and discussions.

This teaching report outlines how I integrate Audience Response Systems in my classes. It starts with a brief introduction to ARS tools before touching on the importance of formative feedback in learning. Afterwards, it outlines different types of classroom activities to actively engage learners with the help of ARS before it turns to the feedback that I have collected from my students on using ARS in our classes.

2. Audience Response Systems and Formative Feedback

Through live polling, Audience Response Systems (ARS) facilitate direct interaction between presenters and their audience. Audience members can answer questions posed by the speaker simply by using their electronic devices (such as smartphones, tablets, or laptops). The results are immediately available and can be presented to everyone in real-time. As such, ARS tools enable different opportunities for formative feedback, making their application particularly valuable in the classroom. *Formative feedback* is feedback that is given for the purpose of learning¹ while the learning process is still taking place. It supports students' learning by showing them what aspects they have already understood and which areas to revisit. At the same time, it also serves as a good indicator for lecturers and teachers to see which intended learning outcomes the students have already achieved and where further attention is needed.

The research literature offers quite a few examples that illustrate how valuable the use of ARS tools in higher education is. Gokbulut (2020), for example, reports on the beneficial use of *Kahoot!* (<https://kahoot.it>) and *Mentimeter* (<https://www.mentimeter.com>) for prospective teachers. Similarly, Pichardo et al. (2021) report how *Mentimeter* helped engage students actively and promote their learning, while Åhman et al. (2021) demonstrate the advantages of using ARS, especially in STEM subjects.

Beyond *Kahoot!* and *Mentimeter*, many other ARS tools can be used in the classroom (see, e.g., Schluer 2022, pp. 160–161 or Brandhofer, 2018, for an overview). Further popular examples are *AhaSlides* (<https://ahaslides.com>), *Particify* (<https://particify.de>) or *Tweedback* (<https://tweedback.de>). Each tool has its strengths and weaknesses and offers different features².

For my teaching needs, an ARS tool should be user-friendly and have an intuitive interface. It would also be preferable to have a PowerPoint add-in for seamless integration of the ARS slide into my presentations. Additionally, it should support specific question types including live polling (for intros, check-ins, quizzes), word clouds (for collecting

1 The opposite of *formative feedback* is *summative feedback*, i.e. feedback on learning, which is typically given at the end of the learning process. Both terms have been coined by Scriven (1967).

2 For a comparative evaluation I recommend the list provided by Brandhofer (2018).

prior knowledge or brainstorming with buzz words), open-ended text (to manage students' ideas after group work and think-pair-share), and possibly brainstorming (similar to open-ended text but allows ranking of ideas through student input after collection). The different scenarios will be explained in more detail in the next section.

3. Classroom Applications for Audience Response Systems

As mentioned earlier, various opportunities exist for integrating ARS in the classroom to engage learners actively. This chapter outlines different contexts where I use ARS with my students enrolled in the B.A. and M.A. *English Studies* program at Chemnitz University of Technology (TU Chemnitz).

3.1. ARS-supported Check-ins at the Beginning of a Class

Check-ins at the beginning of a class offer an excellent opportunity to collect *feedback on how the students feel* at a given moment. This helps to further an understanding of their current state of mind and allows the lecturer to interpret students' actions and performance against this background. Furthermore, it opens the possibility of engaging in a discussion with the students on their current needs. In return, students feel seen and appreciated, which – drawing on the FEASP-approach³ – helps to foster their motivation and thus contributes to a positive learning atmosphere. Another advantage is that it is a very quick activity that does not take up much time but seems to substantially affect the students, as seen from the student feedback discussed in section 4.

Many different types of check-ins can be realized with the help of ARS tools. Usually, I utilize the question type *poll* and either ask the students how they feel on a scale from 1=very low to 5=very good or offer pictures or GIFs while asking them which best reflects their current mood or best describes their current week, etc. I only recently asked my students which film title best described their past weekend (the answer options included *Fast and Furious*, *Hangover*, *Frozen* or *The Pursuit of Happiness*). The possible variations of this activity are endless.

3.2. Audience Response Systems for Collecting (Prior) Knowledge

Using ARS tools to collect and activate prior knowledge helps gather *feedback on what the students already know*. This can take place in the form of brainstorming activities (e.g. *How could VR be used in the context of learning languages?*⁴) or through asking association ques-

3 The abbreviation FEASP stands for Fear, Envy, Anger, Sympathy and Pleasure. According to this approach, teaching should take place in a way to reduce the negative emotions (i.e. fear, envy and anger) and promote positive emotion (i.e. sympathy and pleasure) in order to foster student motivation (cf. Astleitner, 2000).

4 Question asked in my course "E-Learning: learning English with corpora and other tools" (TU Chemnitz, Summer Term 2023).

tions (e.g. *What do you associate with "Intercultural and Digital English World-Wide"?*⁵). The results can serve as a basis for further activities or discussions in class and can also indicate the students' prior knowledge of a particular topic.

To collect and visualize students' responses, I normally use the question type *word cloud* when I expect keywords as answers, or the question type *open-ended* if I expect (one or several) sentences as answers. For both question types, it is usually possible to enable multiple submissions per user. Depending on the ARS tool chosen, it may be possible to hide the results while students are still responding. This bears the advantage that a student's reply will not be influenced by what the others in the class have already posted. Once the students have submitted their ideas, the results can be revealed to the whole course for further discussion.

3.3. Audience Response Systems for Constructing Knowledge

Audience Response Systems can also be used to facilitate the construction of knowledge in the classroom by giving *feedback on what the students think and create*. For this purpose, ARS can be used to support so-called Think-Pair-Share activities (cf. Lyman, 1987). Students are asked to take a few moments to reflect on a question (e.g. *What are opportunities and challenges of e-learning?*⁶ – Think), and then, they are asked to exchange and discuss their ideas with their partners (Pair). Lastly, they are supposed to collect their ideas in a few bullet points or keywords through the ARS tool (Share).

Similar to using ARS to collect prior knowledge outlined above, the question types *open-ended* or *word cloud* are suitable for this activity. The substantial advantage over traditional, non-ARS-supported Think-Pair-Share is that the students' ideas and thoughts are all visualized in the classroom and can directly be addressed by either the lecturer or the students for further discussion (e.g. Lecturer: *This is an interesting aspect. Who put this on the slide? Could you elaborate this idea for us?*). In this sense, it takes away a hurdle for quieter students who tend to shy away from sharing their ideas in class. They already received positive feedback on their answer from their peer in the activity as well as from the lecturer (*This is an interesting idea*) and may thus be more encouraged to explain it to the rest of the class. Secondly, using the ARS tool, all student replies can later be saved and exported for further use. This way, none of the students' ideas is lost, even if not all aspects mentioned on the slide are discussed in class.

Similarly, ARS tools can be used to support group work by collecting, visualizing and presenting students' opinions and findings. Since this type of activity usually yields results which cannot be displayed with keywords alone, the question types *open-ended* or *brainstorming* proved suitable in this context. In analogy to Think-Pair-Share activities, students are asked to record their results and ideas from the group work via the ARS tool. To be able to relate responses to individual groups, it is a good idea to ask students to begin their posts with the group they were assigned to (e.g. *Group 1*). In addition to

5 Question asked in the introductory session of my course "Intercultural and digital English world-wide" (TU Chemnitz, Winter Term 2022/23).

6 Question asked in my course "E-Learning: learning English with corpora and other tools" (TU Chemnitz, Summer Term 2023).

the advantages of collecting and visualizing results with the ARS tool already mentioned above, the ARS slide in this context also serves as the basis for the students' presentation of their results in the plenary. This kind of use also helps to save resources since it is no longer necessary for the lecturer to bring along posters, pens or other items for visualizing the results from group work.

3.4. Audience Response Systems for Checking Knowledge

Another area of application of Audience Response Systems is collecting formative feedback to see *what the students know and have remembered* about a topic (see e.g. Brewer, 2004, or Dufresne & Gerace, 2004, for individual applications or Kay & LeSage, 2009, for an overview). This form of feedback is beneficial for both the lecturers and the learners. It helps to find out whether the students have met the intended learning outcomes, whether they have understood certain concepts or whether there are aspects that should be re-explained or revisited in the course or individually outside of the classroom. As such, this type of ARS use bears a quiz character without negative consequences for the learners if they provide a wrong answer to a question.

Such formative assessment can be conducted at different stages of a course session. It could take place as a review at the beginning of a class to see what students have remembered from the last session or, especially in so-called flipped classroom scenarios (cf. Lage et al., 2000), what they remembered and understood from the preparation for the course. Likewise, it can take place at the end of a session or topic to see what students have taken away and whether the lecturer can move on to the next topic or should clarify some aspects again beforehand.

Many question types are suitable in this context, depending on what the assessment objective is and on what the chosen tool offers. Examples include *quizzes, polls, multiple choice, match pairs, putting items in the correct order*, or even *typing answers* in free text. The quiz type brings in an element of gamification (see e.g. Kapp, 2012) by awarding points not only for correct answers but also for speed and by including leaderboards. Such gamification elements can further enhance student motivation and foster participation by offering a playful type of competition among the class members.

4. Student Feedback on Using ARS in Class

I have implemented ARS regularly into my courses for over two semesters now. During this time, I collected feedback from the students on using ARS in class on various occasions and closely watched how they engaged with the ARS tool.

4.1. What Students Do

Generally, student participation with the ARS tool was high, usually ranging between 90 and 100%. This can be seen as an indicator that students have no issue engaging with ARS and using it in the classroom. Secondly, when using *AhaSlides*, students also make use of the expressive emoji function on the different slides voluntarily. For example, they

add hearts or smileys as reactions to introductory check-ins or other slides. This type of additional engagement and interaction can be interpreted as a sign of the students enjoying the use of ARS tools.

4.2. What Students Say

As part of an ongoing evaluation process, I regularly ask students for anonymous feedback in the form of so-called One-Minute Papers (cf. Angelo & Cross, 1993, pp. 148–153). In this context, I often ask the students to name three things that they liked about the course and that should be maintained as well as three things that could be improved in the future. The following is a summary of the most essential points that related specifically to the use of ARS in class.

Positive aspects that should be maintained:

- The ARS-supported check-ins are evaluated as very positive by almost all my students. Reasons given include that it helps students to better focus on the course and that it motivates them.
- Increased course interactivity through the diversified use of ARS and group work is often highlighted as a positive aspect and rated as motivating and conducive to learning.
- Gamification elements (e.g. ARS quizzes) are also considered motivating.
- Some students also stress the positive course atmosphere⁷.

Aspects that should be changed in the future:

- So far, I have only once received the feedback that the ARS-based check-ins are unnecessary for the course.

The student feedback supports the perceptions outlined above. Students enjoy working with ARS and feel more actively engaged. They report that using ARS fosters their motivation and benefits their learning. Of course, the results now only refer to one cohort of students. It will be interesting to see how other cohorts (perhaps also in other courses or study programs) respond to the concept in the future.

5. Discussion

As outlined above, the students in my courses generally reported to have enjoyed using ARS tools in class and viewed it as positive and favorable for their learning. These findings are also in line with previous reports and studies on the use of ARS in higher education

7 Although not explicitly related to the use of ARS, I included this point as I am convinced that the perception of the learning atmosphere in class being positive is a result of the interactive and engaging course design as such.

(cf., e.g., Åhman et al., 2021; Gokbulut, 2020; Pichardo et al., 2012). ARS can thus offer a great way of actively engaging learners in class.

Nonetheless, teachers and lecturers planning to use ARS in their classrooms need to be aware of some disadvantages that the implementation of ARS might involve. First of all, they need to choose one of the many software options that exist and need to familiarize themselves with it. Some ARS tools will undoubtedly be more user-friendly than others, some require paid subscriptions, and others will offer specific features unavailable to other ARS tools. Secondly, the required ARS slides need to be prepared before class. While creating ARS slides on the spot is certainly possible, it will take a few moments, even for advanced users. Moreover, one has to keep in mind that the slides need to be made available to the students in class, be it via a QR code or link. Preparing the use of ARS in class beforehand will guarantee a smoother application and support lecturers who are new to using ARS. Another disadvantage is that students need to utilize their own devices. It is certainly beneficial that current online ARS tools are easily accessible for students, and in fact, this is one reason in favor of using them. However, it needs to be borne in mind that this means that students have to use their devices to engage with the questions. Finally, lecturers must check whether a tool complies with data protection regulations before using it in the classroom.

On the other hand, there are many positive aspects related to using ARS tools in class. First of all, ARS are readily available and can easily be integrated and implemented in the classroom. All it takes is a (relatively) stable internet connection, and students can join in and participate with their own devices. Since practically all students own a smartphone, this is easily possible. The lecturer only needs to share access to the ARS tool by displaying a QR code or providing a link or access code. This can happen either through a projection in class or even via the learning platform. Moreover, current ARS offer a high diversity in question types, which makes ARS very versatile in application. Example activities as the ones outlined above can easily be transferred and adapted to other teaching contexts and needs. In addition, using ARS in class offers the opportunity for a low-threshold activation of the students, including those that tend to be quieter in general. This helps to make lessons more inclusive for different student preferences and needs. Last but not least, implementing ARS tools in class is a resource-efficient way of collecting, displaying and storing results that were developed and presented in class. Most of the tools available allow the export of the results to different data formats, such as .xls files, PDF or images. These results can then easily be shared with the class, either by uploading them directly to the learning platform or by incorporating them into the course material.

6. Conclusion

The present paper has reported several ways of integrating ARS tools in class. They support a shift from passive to active learners by actively engaging students in class. Not only can ARS foster student participation, but they also help to sustain or enhance their motivation while contributing to a positive learning atmosphere in the classroom.

Overall, ARS tools can be used in a multitude of contexts in which they serve different purposes. For example, they can engage students and activate their prior knowledge on a

topic. Moreover, they can help to check in with students to see what they currently need and how their needs could be adapted to. ARS tools also serve to collect formative feedback, which is helpful for students and lecturers alike. They can give insights into what students have already understood and what aspects must be reconsidered or revised. This formative feedback can be collected through quizzes, which helps to further bring in the element of gamification. And finally, ARS tools not only allow to display students' answers in real-time, but they also help to save these answers and findings to make them available to the whole class afterwards. As such, ARS arguably enrich higher education teaching in many ways.

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Using Student Feedback to Improve Teaching Practice – A Teaching Idea

Sara Wohlschläger

Abstract *While teachers regularly give feedback to their students, they rarely ask for feedback from their students. In considering digital student feedback as a pupil voice strategy, this teaching idea endeavors to encourage teachers to listen to their students in order to improve their teaching. Starting with a discussion of the theory regarding pupil voice and digital student feedback, the theory is then put into practice as the teaching idea is presented. The tool used in this teaching idea is Oncoo, a website that transforms students' questionnaire answers into a visual feedback target.*

Keywords *student feedback; visual feedback target; pupil voice; teaching idea; classroom*

1. Introduction

Feedback is a key aspect of school education. While teachers regularly provide feedback to their students, e.g. when giving marks or correcting essays, a smaller number of teachers actively seeks feedback from their students. This imbalance of feedback giving and receiving seems to correlate with the distribution of power and knowledge between teachers and students. This trend has been observed by Wisniewski et al. (2020) who find in their meta-analysis of feedback studies that “[o]nly a very small percentage of the primary studies investigated feedback from students to teachers” (p. 12). However, teachers can greatly benefit from student feedback. In fact, Zierer and Wisniewski (2019) suggest that

“Student feedback has a demonstrably positive effect not only on student achievement but also on the satisfaction and health of teachers. There is no scientific confirmation whatsoever that it has any negative impact on pedagogical practice. However, it takes courage to start asking for student feedback.” (p. 35)

It is thus the aim of this theory-grounded teaching idea to relieve teachers of this fear of asking for feedback and to encourage them to listen to their students. This article will

start with a discussion of the relevant theory regarding pupil voice and digital student feedback before the theory is put into practice as the teaching idea is presented. The article concludes with a short reflection on the teaching idea.

2. Pupil Voice and Digital Student Feedback

As the wealth of scholarship on the subject illustrates, feedback can serve many purposes and has been defined in various ways. Therefore, it is necessary to be more specific about what kind of feedback will be dealt with in this contribution. Zierer and Wisniewski define feedback as “a data-based exchange of information between people” (2019, p. 12). Who exactly these people are remains open in this definition. In a school context, feedback can be given from teachers to learners, teachers to teachers, learners to learners and, finally, from learners to teachers. Moreover, the way in which feedback is given can be just as diverse: from analogue handwritten notes to digital feedback provided by apps or websites. As a meta-analysis of empirical research studies on feedback conducted by Wisniewski et al. (2020) reveals, feedback from teachers to students is most common whereas feedback from students to teachers is much less common (p. 11). Zierer and Wisniewski find that “feedback for teachers is usually limited to rare and spontaneous individual opinions and opinions of superiors in the context of official evaluation” (2019, p. 28). If feedback is systematically gathered at all, it tends to be collected as summative evaluation at the end of the school year or at the end of a school subject, as Anders (2021, p. 219) asserts. A reason for this lack of regular student feedback could be that teachers might be skeptical of their students' expertise.

The idea of the pupil voice argues against this impression and sees the students' perspective as a valuable insight and an opportunity to improve teaching. The basic premise of the concept is “that listening and responding to what pupils say about their experiences as learners can be a powerful tool in helping teachers to investigate and improve their own practice” (Flutter, 2007, p. 344). In order to help students learn, “teaching cannot and must not be a one-way street” (Zierer & Wisniewski, 2019, p. 24). Flutter (2007) further argues that a “meaningful dialogue between teachers and pupils through the use of pupil voice strategies offers an important starting point in developing the art of teaching” (p. 344). By simply asking students what they think of a lesson, the teacher can easily elicit a spontaneous feedback response (Zierer & Wisniewski, 2019, p. 44). However, to use student feedback efficiently, “it makes sense to have clearly defined criteria; ask the whole class; and conduct surveys anonymously” (Zierer & Wisniewski, 2019, p. 44). When done efficiently, student feedback can “reveal blind spots by comparing perspectives” (Zierer & Wisniewski, 2019, p. 29) but also “further enhance reflective capacities in teachers; inform teachers about the individual needs of their students; and, open up a dialogue of teaching and learning in the classroom” (Mandouit, 2018, p. 12). All in all, student feedback as a pupil voice strategy “can be [a] transformative experienc[e] for teachers” (Flutter, 2007, p. 351) but only if the initial feedback remains merely the first step of the process.

Working with student feedback is a process that is inextricably linked to reflection on different levels of complexity. In order to effectively use student feedback, a teacher

should attempt to answer all of Hattie and Timperley’s questions (Table 1). In any case, it should be stressed that feed-back “has no effect in a vacuum; to be powerful in its effect, there must be a learning context to which feedback is addressed” (Hattie & Timperley, 2007, p. 82).

Table 1: Questions of Feed-up, Feed-back and Feed-forward (adapted from Hattie and Timperley and Zierer and Wisniewski)¹

Terms by Zierer and Wisniewski	Relevant statuses according to Zierer and Wisniewski (2019)	Questions posed by Hattie and Timperley (2007)
Feed-up	actual status and target status	Where am I going?
Feed-back	actual status and previous status	How am I going?
Feed-forward	target status	Where to next?

Feedback is highly efficient when it is high in information, meaning that it “contains information on task, process and (sometimes) self-regulation level” (Wisniewski et al., 2020, p. 12). These levels denote different aspects towards which the feedback is directed. Feedback on the task level addresses “how well a task is being accomplished or performed” (Hattie & Timperley, 2007, p. 91). The next level is that of the process which targets “the processing of information, or learning processes requiring understanding or completing the task” (Hattie & Timperley, 2007, p. 90). On the level of self-regulation, the recipient obtains information about the “control mechanisms of his or her performance” (Zierer & Wisniewski, 2019, p. 16). The level of the self is left out in this consideration since it is “too often unrelated to performance on the task” (Hattie & Timperley, 2007, p. 90). Taking into account all these considerations, a very differentiated and complex image of feedback emerges that already suggests the amount of work that needs to be put into the implementation of student feedback.

Whereas traditional methods of eliciting student feedback made great demands on teachers and their time, digital student feedback provides a solution that fits the 21st century classroom. Aside from the teachers’ time expenditure before, during and after the lesson, handwritten student feedback can seldom be entirely anonymous since teachers usually know their students’ handwriting (Wisniewski, 2019, pp. 59–60). Furthermore, the elaborate processing of such feedback in spreadsheets or tally charts (Zierer & Wisniewski, 2019, p. 66) surely dissuades many teachers from even considering student feedback. However, as Zierer and Wisniewski (2019) remark, “[t]hanks to digital instruments, the collection of meaningful and differentiated student feedback is also possible in a short amount of time” (p. 94). In many cases, the results of the feedback can immediately be shared with the class since the tools often analyze the results which can consequently make the elicitation of feedback more effective (Wisniewski, 2019, p. 60). In ad-

1 A detailed discussion of the steps and terms can be found in Hattie and Timperley (2007) as well as Zierer and Wisniewski (2019).

dition to other benefits of digital feedback, which unfortunately cannot be discussed in this contribution, the digital competence of the students is promoted, and the students are therefore being prepared for the digital society of the 21st century (Wisniewski, 2019, p. 58). On the teachers' side, a reduction in time and workload can be seen more than anything else. However, the feedback does not elicit itself. The teaching idea proposed in this paper is meant to provide guidance in that respect.

3. From Theory to Practice: The Teaching Idea

When using digital student feedback to improve teaching, it is beneficial to work through the three questions suggested by Hattie and Timperley (2007). In the following section, the process will be illustrated through the fictitious elicitation of student feedback regarding the teacher's setting of tasks (see also the Appendix for details).

3.1. Feed-up: Where am I going?

The first step in eliciting student feedback is the identification of an aspect on which feedback should be obtained. In line with the idea of feed-up, the target status for this aspect must be identified and described. As an exemplary aspect, the task instructions by the teacher are chosen here. Let us assume that the teacher notices that, even though they had prepared their instructions very carefully, the students seem to have trouble following those instructions. In a quick brainstorming activity, the teacher determines that a task is well-set when it is clear and understandable (both acoustically and regarding vocabulary) and when it does not contain too much or too little information. With this in mind, statements need to be formulated that address this target status (see 5.1 Feed-up) so that students can respond to them in the feed-back step. These statements should ideally deal with the task and process level.

Figure 1: Illustration of a Questionnaire with a Likert Scale in Oncoo



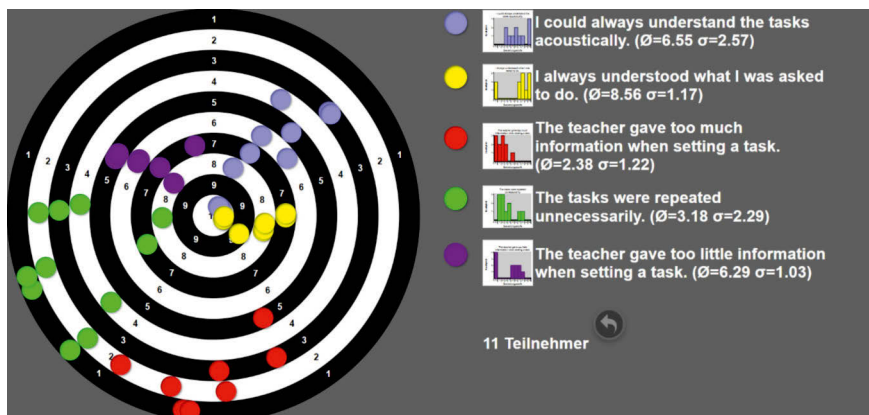
In the next step, the statements need to be entered into the feedback app. As there are many options for digital feedback apps (see Stiehler, 2021, for an overview), the choice of

the ideal feedback app can be overwhelming for the teacher. To cite only a few examples, there is *Oncoo* for visual feedback, *Mentimeter* for quiz-style feedback or *AnswerGarden* for short comments or word clouds. In this teaching idea, the visual feedback tool *Oncoo* (Müller & Rohde, 2015–2024), where a questionnaire with answers on a Likert scale (see Figure 1) is transformed by the website into a visual representation of a target (see Figure 2), is chosen. To use this tool, neither the teacher nor the students need to sign up. However, the teacher can create a password to protect the results from the students. Once the statements are entered by the teacher, a code is provided that can then be shared with the students. This allows the whole class to give feedback anonymously.

3.2. Feed-back: How am I going?

During the feed-back step, it is finally time to ask the students. At the end of a lesson, the students receive the short code for the *Oncoo* questionnaire by sharing it or the QR code provided by the website (see 5.2 Feed-back). Consequently, the students can open the website on their mobile devices and enter the code to arrive at the questionnaire. On a scale from one to ten, the students rate their agreement to the prepared statements and then submit their rating. In real time, the five statements from the previous section are automatically assigned a section on the feedback target. When we look at the results for “I always understood what I was asked to do”, for example, the second section of the feedback target is considered. Each dot in this section represents one student answer. The closer the dot is to the center, the more the student agrees with the statement, i.e. when a student chooses 10 (I agree) on the scale, their dot is displayed in the very center of the feedback target. What we thus see in Figure 2 is that most students agree with the statement. Due to the visual representation of the results on the feedback target, the feedback can be understood very quickly. The target itself can either be immediately shared with the students or be kept hidden from them. It is here that the benefits of digital student feedback are most evident because the presentation of results is immediate and requires no special effort on the side of the teacher.

Figure 2: Illustration of a Feedback Target in Oncoo



3.3. Feed-forward: Where to next?

There are several ways to deal with the feedback results in the feed-forward step. The first possibility is that solely the teacher looks at the feedback and reflects on what can be done to reach the target status. Here, it might be a good idea to consider relevant literature in order to identify measures of possible improvement. The other possibility is to involve the students in the process so that they can once again engage in a dialogue on teaching and learning in line with the idea of pupil voice. Consequently, student ideas can play a role in teacher's development of the teaching and learning process (see Feed-forward). In this step, feedback on the level of self-regulation can be extremely valuable. If the students feel comfortable, they can suggest alternative actions to help the teacher regulate their performance. As a consequence of this "debriefing", the teacher should communicate which measures will be taken up in order to change the status quo (Zierer & Wisniewski, 2019, p. 61). After a certain period of time, another round of student feedback should be elicited (Zierer & Wisniewski, 2019, p. 61). When doing this, the teacher can see what has or has not changed. This process can and should be repeated until both teacher and students are happy with the teaching quality.

4. Conclusion

Implementing student feedback may appear like a big challenge if one has never done it before. It certainly "requires much skill by students and teachers" (Hattie & Timperley, 2007, p. 103) but it can also motivate teachers to "keep up a dialogue with students about teaching and learning" (Zierer & Wisniewski, 2019, p. 76). Giving and receiving feedback is a skill that needs to be developed and especially with digital tools, there is "no 'golden path' of the correct methods" (Zierer & Wisniewski, 2019, p. 47). As such, the presented teaching idea is not a universal solution for gathering student feedback. Since *Oncoo* is a German website, it can be slightly adapted for the context of an English classroom in German schools, but the user interface remains German. However, many tools are available to explore and experiment with; and as feedback is a skill, learning by doing may be the best method to master it.

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5. Appendix

5.1. Feed-up

Statements about the task instructions

- (1) I could always understand the tasks acoustically.
- (2) I always understood what I was asked to do.
- (3) The teacher gave too much information when setting a task.
- (4) The tasks were repeated unnecessarily.
- (5) The teacher gave too little information when setting a task.

5.2. Feed-back

Table 2: Excerpt from a Lesson Grid: Setting of Tasks during a Lesson – Student Feedback Elicitation

Time	Step	Procedure	Media /Material
		...	
5 min	Elicitation of student feedback	<p>Teacher: <i>Before we finish our lesson today, I would like you to give me some feedback. As you know, even your teachers are not perfect and can always learn something.</i></p> <p><i>You will need your smartphone/your tablet/a school laptop to do this. In a moment, I will share a (QR) code with you. Once you follow the code, you will see five statements. Please rate your agreement to these statements on a scale from one to ten and please be honest.</i></p> <p>(The teacher shares the (QR) code with the students. The students scan/enter the code into their devices and react to the statements.)</p> <p>Teacher: <i>Thank you for reacting to these statements! We will talk about the results in the next lesson.</i></p>	<p>mobile devices for the students, internet access</p> <p>share the (QR) code for Oncoo (smart board/blackboard)</p>
2 min	Farewell to the pupils	<p>Teacher: <i>That's all for today! I wish you a great rest of your day and I will see you on Thursday! Goodbye!</i></p> <p>Students: <i>Goodbye!</i></p>	-

5.3. Feed-forward

Table 3: Excerpt from a Lesson Grid: Setting of Tasks during a Lesson – Student Feedback Debriefing

Time	Step	Procedure	Media / Material
1 min	Welcome students	Teacher: <i>Good morning, everybody! Welcome to class!</i> Students: <i>Good morning!</i>	-
10 min	Debriefing of feedback from previous lesson	<p>Teacher: <i>As you might remember, at the end of the last lesson you gave me some feedback about my teaching. I would like to thank you once again. This is really helpful for me as I am always learning how I can improve my teaching. Let's have a look at the results of the feedback and let's discuss what I could do to become a better teacher for you.</i></p> <p>(The teacher presents the results of the feedback and asks students whether they would like to comment. Once the results have been presented, the teacher asks the students what could be done to improve the teaching and learning in the classroom. The teacher should make very clear that it is safe for the students to speak their mind and that there will be no negative consequences should they criticize the teaching or the teacher.)</p> <p>Possible student answers for the example: → <i>The teacher could prepare the tasks in advance so that they are clear and carry the right amount of information.</i> → <i>The teacher could speak louder.</i> → <i>The teacher could stress tasks more, so that they are recognized as tasks.</i> → ...</p>	<p>presentation slide with the feedback results (projector, computer/interactive whiteboard/smart board)</p> <p>something to take notes with (for the teacher)</p>
		...	

Integrating Feedback in a Rich Digital Writing Environment with Padlet

Ralf Giebler & Jana Maria Olejniczak

Abstract *In this chapter, it is argued that Padlet can be used to set up a rich digital writing environment which has the potential to increase the quality of the writing processes through feedback. The functionalities of Padlet enable the provision and reception of feedback about content-based as well as language-related issues while students work on an essay-writing task. Content information about the topic of their essay as well as criteria for assessing the quality of texts are provided via various individual pads (i.e. the posts on the canvas) on Padlet. The online notice board of Padlet is used to foster computer-mediated writing and create a feedback ecology that allows for multi-directional and multi-faceted feedback, including peer and teacher feedback.*

Keywords *Padlet; online collaborative feedback; digital feedback; EFL writing; advance organizer*

1. Introduction

In this contribution, we suggest using Padlet as a tool for planning, feedback and formative assessment in the pre-writing or drafting stage of a composition task. Padlet can be characterized as an “online notice board” (Schluer, 2022, p. 93) that supports learners in the brainstorming phase where ideas need to be grouped and categorized thematically. In addition, “different multimedia elements and other websites can be posted as well and can be utilized for feed-forward suggestions” (Schluer, 2022, p. 93) – both by peers and the teacher (cf. Aubrey, 2014).

Research tells us that students tend to be more expressive in modes that facilitate the collaborative construction of knowledge (Li, 2021, p. 14). When L2 learners work in pairs and draw on technological tools, they negotiate meaning, make joint decisions throughout the writing process, and produce a single text with shared responsibility and co-ownership (Li, 2018; Storch, 2002). Writing has always been considered as a complex activity. Since in the digital age it has been “reconceptualized as multimodal composing, which enables writers to deploy multiple semiotic resources (e.g., linguistic, visual, audio, gestural, spatial) to construct meaning and engage audience” (Li, 2021, p. 8), the complex-

ity has increased. The “process of meaning making and knowledge transformation” in a digital environment can be regarded “as dynamic, non-linear, and recursive rather than a product-oriented activity” (Li, 2021, p. 15).

Cloud editors or cloud-based editing applications, such as Google Docs or Padlet, allow for interactive and collaborative online feedback, both synchronously and asynchronously (Schluer, 2022, p. 92). Collaborative online editors support learners in the process of planning, editing, and revising a text-based production task. Computer-mediated writing allows students to engage in text-based communication and prompt interaction. Furthermore, in asynchronous phases of writing, students may also take the time to pause, reflect, and think carefully during writing and in-between their interactive moves. Teachers may still wonder whether there are also ways to realize formative assessment and provide adequate and timely feedback to L2 writers. In fact, Padlet allows for an easy organization of comments and resources in different multimedia formats. It is useful for feedback on brainstorming and categorization tasks in the pre-writing stage. Teachers and peers can reply to the text in pads by ranking, rating, coloring or commenting. Those comments appear in a chat-like format and may thus initiate further dialogues about the text among the students. Even first-time users find Padlet easy to operate (Sari, 2019).

Another advantage in this respect is that learners can respond to the feedback from various sources quickly afterwards. Fuccio (2014, p. 209) points out that localizing comments is easier for learners as they are attached to specific topic-related pads in the Padlet. Easy localization of comments may also lead to several feedback cycles (Wood, 2019) and stimulate an asynchronous drafting and editing mode among peers and their instructor. More extended discussions about topic-, language- and genre-related aspects of the writing task can arise, which makes Padlet an effective tool in the digitally enhanced EFL writing class.

Schluer (2022, p. 96) summarizes research from studies on online collaborative feedback tools that demonstrate the effectiveness of online collaborative feedback regarding writing performance and the development of EFL learners' academic writing skills. Feedback through comments on clearly localized text passages seems to encourage self-correction overall and thus strengthens self-regulated learning (Shintani, 2016, pp. 527–528, cited in Schluer, 2022, p. 96).

2. How to Use Padlet for Feedback and Formative Assessment in EFL Writing

In our teaching suggestion, a Padlet is created that consists of prompts, topic-related information and multimodal content. It is offered to learners at the onset of the writing task. As such, it comes to the learner as an advance organizer – an idea that is connected to concepts of self-regulated learning. Ausubel (1960) originally proposed the concept of the advance organizer, a conceptual model used for activating prior knowledge and organizing contents prior to receiving new information. Overall, the advance organizer can be seen as a repertoire of information, relevant to accomplish the writing task. Learning is enhanced when learners can link information to their existing cognitive structures,

thereby enabling them to organize and interpret new information. In that sense advance organizers can either present salient prerequisite knowledge not known to the learner or help the learner establish connections between relevant dimensions of existing knowledge and new pieces of information. In the context of *digital* EFL writing, advance organizers appear to be of high relevance, since writing in a digital environment tends to be non-linear and more cyclical. Padlet is a digital notice board which allows for the integration of multimedia content. As an enhanced digital space, it can be used to share and make public education-specific content. Padlet as a commonly used tool is flexible enough to provide, e.g., a topic-related word bank, background information about the specific topic, or genre-specific writing instructions, to name but a few. However, the focus will be on topic-related information that is relevant for the writing task at stake. As learners use Padlet to give each other feedback, it turns into a rich writing and feedback environment in which Computer-Mediated Communication (CMC) and Computer-Mediated Teacher and Peer Feedback (CMTF, CMPF) are realized.

2.1. Structure of our Padlet

Our idea of creating a rich digital writing environment with the help of Padlet supports individual as well as collaborative writing processes. The Padlet does not prescribe a specific linear order of text composing, since the learners are to work at their own pace, making use of and contributing themselves to the evolving digital learning environment. As learners see how the Padlet is filled with additional information, they are also invited to evaluate the usefulness of the information.

For this purpose, the Padlet provides a template for giving feedback on the comments of their peers. Furthermore, Padlet opens up a digital space for negotiating open questions and receiving feedback from the teacher and from fellow students. With the help of Padlet, multi-directional and multi-faceted feedback can be staged. Through its non-linear structure and various interactive options, “feed back” as well as “feed up” and “feed forward” can be realized. These terms are used to describe different aspects of feedback in instructional design and play a distinct role in the learning process (cf. Hattie, Beywl, & Zierer, 2013, p. 209):

- (1) Feed Up: The concept of “feed up” in feedback refers to providing students with a clear understanding of the learning goals or objectives. It helps students understand what is expected of them and what they are trying to achieve. This type of feedback is forward-looking and focuses on the desired outcomes of the writing task.
- (2) Feed Forward: “Feed forward” feedback, on the other hand, is about providing guidance and suggestions for improvement before a student submits a final assignment or assessment. It is proactive and helps students improve their texts before grading. Feed forward is often seen as more formative, with the aim of supporting learning and skill development rather than simply assessing performance.
- (3) Feed Back: This type of feedback is about monitoring the writing process and assessing how much progress has been made. Progress concerns the amount of information and the level of organizing pieces of information into coherent paragraphs. It

is also about reflecting on the amount of information, e.g. about the topic *American Dream*, that learners have already found and selected.

Each feedback type can operate at four levels (Hattie & Timperley, 2007, p. 87):

- (1) Task
- (2) Process
- (3) Self-regulation
- (4) Self

Feedback related to the task aims at ensuring that learners know what to do and understand what the task involves. Feedback related to the process focusses on the steps that need to be taken during the writing process, e.g. planning, researching, drafting, editing. The third level of feedback addresses learners' level of self-regulation, i.e. in how far they manage to exploit the various sources of input and adapt them to their own line of argument. Feedback might also operate on the individual learner's personality when they provide and receive feedback by their peers. Here, mitigation strategies and criteria for providing peer feedback are essential.

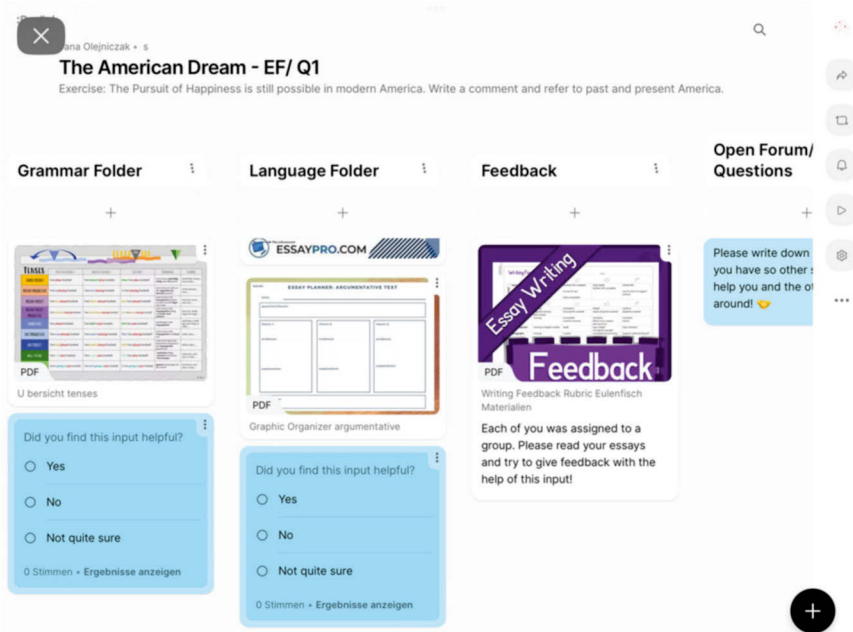
2.2. Example: A Padlet about the American Dream

The exemplary Padlet presented in this paper deals with the topic of the American Dream: its origins and its development up to the present day. The American Dream is one of the obligatory topics for the German high school diploma, which is administered as a statewide mandatory test (MSB, 2023, pp. 26, 34). The instruction for the essay-writing task is as follows: "The pursuit of happiness is still possible in modern America. Write a comment and refer to past and present America."

Seven different sections of the Padlet (pads) provide students with a broad range of topic-related input materials. Besides one section that evokes prior knowledge and asks for research interests, learners also have the opportunity to watch various YouTube videos that offer historical, factual information about the concepts underlying the *American Dream*. Furthermore, to prepare the ground for the comment, also critical voices and YouTube videos are provided. Depending on their individual field of interest, learners search for and add videos, poems, pictures, or any other digital resources relevant to the topic. For the evaluation of these resources, the peers come into play.

dents might skip certain steps to come up with their final essay, others may want to check their language and consult the pad that contains the grammar folder. Additionally, the rich repertoire of YouTube videos allows for an individual focus within the writing process. However, the student is not overwhelmed by various topics but has enough creative space to ask him- or herself: Where am I going? What do I need? What do I want to find out about a particular aspect of the given topic?

Figure 2: Pad with Feedback Options



3.2. Feed-forward by Providing Useful Vocabulary in a Language Folder

Students have access to useful phrases and multi-word units that support them during the writing process. The language folder contains a repertoire of possible sentence beginnings as well as essential topic- and genre-related vocabulary, such as linguistic means for arguing or expressing an opinion. Both pads can strengthen students' motivation as they plan the next steps and see that the target task is within reach.

3.3. Feedback on the Essay Draft

Students are supposed to give feedback about the structure and content of the Padlet as realized by the various pads. For example, in one pad students are asked to evaluate whether they find specific input helpful. There are also pads which encourage peer feedback (cf. Figure 2). On the basis of their peers' feedback, students revise their draft before handing in the final essay to their teacher. Peer feedback allows for a dynamic and

meaningful discourse about the text between learners, which is both concerned with negotiation of meaning and of form. To support peer feedback, the pad is linked to a feedback sheet that draws learners' attention to various aspects of their writing. In detail, the feedback sheet is included in the pad 'feedback'. It contains four levels of language and content-related proficiency and helps students and teachers to identify well-written parts, as well as some parts that need to be improved. Additionally, the feedback sheet helps students to reflect on whether they can deal with complex texts on their own or whether they need more support in mastering a particular genre.

It is essential that in this round of feedback, positive as well as negative aspects will be addressed. Thus, peer feedback can provide a fairly detailed and balanced form of feedback, which also gives students a first impression of how their essay might be received by a diverse readership. In an attempt to improve their essays, students are supposed to, e.g., rewrite specific phrases or rethink their line of argument or their flow of ideas. Subsequently, i.e. after the peer feedback, the teacher has the chance to gain more insights about the individual revision and editing processes than s/he would normally get in an ordinary, paper-and-pencil-based writing class. In the final section of this paper, we will also turn to additional technical settings in Padlet.

4. Conclusion

This chapter has presented a teaching idea that facilitates students' pre-writing processes through advance organizers and collaborative feedback exchanges on Padlet. On an exemplary basis, it has outlined different settings and sample pads to support the students in an essay-writing task. Beyond that, teachers can easily adjust the settings of a Padlet in further ways. For example, in 'Posts', you control the rules for new and existing posts on your Padlet. If you click 'Show' for the 'Author and Timestamp' option, posts by users who are logged into their accounts will contain the author's name and timestamp. In order to retrace every comment made by their students and track potentially rude or offensive comments in the pads, we recommend that teachers activate this 'Author and Timestamp' option in the Padlet settings. Moreover, we would encourage teachers to choose the option 'Manual Approval', which means that the teacher needs to check every new post before it turns visible. In case a particular group of learners gives the impression of being mature enough, the setting option 'Automatic Approval' could be chosen. This would also reduce potential time delays and thus enhance student interactions on the Padlet. Adapting the Padlet to different topics is also easy, since the feedback options and language-related resources can be kept for writing tasks on different topics which are demanded by the curricula, such as dystopian and utopian worlds and globalization (MSB, 2023, p. 35).

Nevertheless, the idea of the Padlet must be viewed critically in terms of the technical requirements. As it is an online tool, a stable internet connection is a prerequisite. Constant access to the internet can also be a problem for learners since the risk of distraction is given. Furthermore, teachers cannot know for sure whether the learners produced the text all by themselves and to what extent they made use of internet resources. However,

Padlet offers a tracking function which helps teachers to observe and track their learners' step-by-step progress.

In the future, we hope to recruit student teachers and in-service teachers who are willing to try out Padlet as an advance organizer as well as a means for realizing online collaborative feedback. Padlet has a clear potential to change the writing process in the digital world. Reading and writing will be meshed as learners process feedback, review pads with topic-related resources and edit their text in the various pads. Concerning teacher education and training, we hope to be able to stir reflection among practicing teachers regarding the non-linear, reflexive and collaborative nature of writing in the digitally enhanced EFL classroom.

In fact, writing in the digital age goes far beyond the ability to read and write. Digital literacies are fluid and dynamic as they highlight the agency of writers in all the stages of a process-oriented writing curriculum. Padlet supports writers while engaging in meaning-making through deploying multimedia resources. The use of a Padlet in the EFL classroom places literacy practices in a digitally enhanced social context, which is characterized by "shared understandings, ideologies and social identities as well as the social rules that regulate the access and distribution of texts" (Li, 2021, p. 26). As the digital writing environment of the Padlet is non-linear, dynamic and allows for flexible usage, it helps to realize self-regulated learning. Padlet allows for open questions which stimulate reflective thinking and meta-linguistic awareness about writing and topic-related language use. The threshold "to critically evaluate online information, create multimodal texts, remix online texts, and interact with others in the online learning community" (Li, 2021, p. 26) is thus lowered.

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On the Use of Criteria-based Peer Feedback in Online Preparation Courses for the Digital TestDaF – Assumptions, Implementation and Reflections

Ines Paland-Riedmüller, Simone Weidinger, Anastasia Drackert

Abstract *In many educational contexts, learning a language may serve as a means to achieve life-planning goals, and in some cases, language test results can impact critical decisions, such as pursuing Higher Education (HE) abroad. It is therefore not surprising that in language courses for test preparation, learners often focus their efforts on passing the test instead of improving their language competences more generally and therefore prefer traditional preparation approaches like teaching to the test to alternative teaching methods. In this article, we propose a learning-oriented approach to exam preparation including engagement with peer feedback in order to raise test takers' awareness of key factors for the successful handling of language situations during their studies. We describe how and why criteria-based peer feedback is implemented in an online test preparation course for the digital TestDaF, a high-stake standardized language proficiency test for language admission to HE in Germany. Furthermore, we report on tutors' and course participants' opinions about giving peer feedback.*

Keywords *peer assessment; test preparation; online language learning; learner autonomy; learning-oriented assessment*

1. Introduction

Feedback is one of the key factors for learning regardless of the context (cf. Hattie & Timperley, 2007). To be effective, it has to meet a number of criteria. In her 2022 review of pertinent literature on feedback, Schluer identified the following aspects: feedback should be based on transparent assessment criteria, it should provide reasons why something is (in)correct and suggestions for improvement, it should be specific, structured and easy to follow, personalized and individualized and, more importantly, it should be provided quickly and on a regular basis (Schluer, 2022, pp. 29–30). Another important factor is students' active involvement with feedback.

Traditionally, feedback has been seen as a quite unidirectional information transmission process from teachers to learners about the gap between the learners' current level of performance and the learning goal referred to. In recent years, especially with the increasing relevance of learner autonomy and cooperative learning, alternative and more dialogue-based types of feedback, such as peer feedback, have received a lot of attention (Tzagari et al., 2018).

After providing an overview of current research on peer feedback in foreign language learning (section 2), this article describes the implementation and rationale behind criteria-based peer feedback within an online test preparation course for the digital TestDaF, a high-stakes standardized language proficiency examination for admission to Higher Education institutions in Germany (section 3). Subsequently, the paper reports on the experience of both tutors and course participants with peer feedback (section 4).

2. On the Role of Peer Feedback in Language Learning and Test Preparation

Peer feedback is usually applied for assessing oral and written performances and can be done in pairs or groups. The distinct feature of peer feedback, defined by Topping (2017) as "an arrangement for learners to consider and specify the level, value, or quality of a product or performance of other equal-status learners" (p. 1), is the role learners play in the learning process. Learners are not merely the receivers of feedback, they are the ones who give feedback and thus perform the role of a teacher or a rater. This alternative role in a learning process leads to several benefits for the learners: the learners can improve their reflection skills and become more autonomous and more critical of their own learning outcomes (e.g. Yu & Lee, 2016), they spend more time on task, are more motivated and get a greater quantity of feedback. At the same time, the implementation of peer feedback is time consuming for language learners, and especially without prior experience, learners may not always actively engage in peer feedback. Moreover, it is not always as accurate as teachers' feedback and is not always perceived as the most helpful type of feedback in comparison to teachers' feedback (Hansen Edwards, 2013).

As there is no one and only way to implement peer feedback, the implementation can differ in terms of mode (face-to-face, online, pen and paper), frequency of use, and form (rubrics, open-ended questions, etc.). However, in previous research one can find several suggestions for implementing peer feedback: Students should receive training to conduct peer feedback and should be involved in developing the evaluation criteria (cf. Liu & Carless, 2006; Peng, 2009). Peer feedback should be used with other types of assessment methods, such as collaborative assessment or self-assessments. Prior to the actual peer feedback activity, there should be opportunities for practicing peer feedback and discussion (Liu & Carless, 2006). It is advisable to limit feedback to clear and broad ratings instead of overly detailed ones (cf. Peng, 2009). Finally, thorough planning and thoughtful design should go into the peer feedback activity, and it should be conducted anonymously.

When preparing for high stakes tests, such as university admission tests, studies on test preparation practices and preferences indicate that prospective test-takers around the globe are very much interested in knowing whether a certain performance is suffi-

cient to pass the test, e.g. by getting feedback from language teachers (O'Sullivan et al., 2021). Furthermore, they have a clear preference for test-taking skills over general language learning. In their review of studies on test preparation practices and preferences, Zimmermann et al. (2024) found that potential test candidates worldwide tend to prepare themselves by downloading and working through sample tests and exercises based on test task types.

In order to better understand the context of the online test preparation course we developed and the reasons for implementing peer feedback activities in this course, we will give a description of the test. The TestDaF, a standardized language proficiency test officially recognized for language admission to HE in Germany (Norris & Drackert, 2018), focuses on tasks that elicit competencies for participation in the academic discourse (cf. Kecker & Eckes, 2022). The digital TestDaF comprises a total of 23 tasks organized in four test sections: reading, listening, writing, and speaking. The tasks are based on relevant communicative situations in HE contexts such as extracting information from written and spoken texts, comparing and producing summaries of texts and graphs, reacting to statements of others and expressing one's opinion. Besides tasks focusing on just one skill, there are several integrated tasks addressing more than one language skills.

In our opinion, test preparation for a language admission test like the digital TestDaF should comprise more than the mere familiarization with test tasks and test-taking strategies. Learners should not only know the task types of the test, but should also reflect on how relevant these tasks are for effective communication in a Higher Education context. This could not only increase test takers' chances to attain a high test score, but can also help them to reach their long term goal of studying in Germany. Hence, an approach for test preparation that is based on the principles of learning-oriented assessment (LOA) as described by Carless (2007) seemed useful for this intention. Among the three principles of LOA are 1) "assessment tasks as learning tasks", 2) "student involvement", and 3) "feedback as feedforward" (p. 57). It is mostly the second principle we would like to focus on in our argument for using peer feedback in the context of preparation for high stakes language tests. According to this principle, students should be involved in the assessment by "actively engaging with criteria, quality, their own and/or peers' performance" (Carless 2007, p. 60). Self and peer evaluation activities might be good ways to encourage students to actively seek, give and engage with feedback (Carless, 2007; Lam, 2021) and guide students towards more independence within their learning processes.

3. Implementation of Peer Feedback in an Online Test Preparation Course

In this section, we will outline the general characteristics of an online test preparation course for a group of students that is assisted by a tutor. We share our considerations which led to the integration of peer feedback activities during its development. We will illustrate the role of learning activities and feedback methods by using the learning units that focus on the test's integrated writing task as an example. We will conclude this section with an example of peer feedback given in one group of students.

3.1. The Online Preparation Course "Gruppenkurs Training digitaler TestDaF"

The online test preparation course described in this article is offered by Deutsch-Uni Online (DUO). Language learners from all over the world can take part in this "Gruppenkurs Training digitaler TestDaF" (Group course Training for the digital TestDaF) six weeks prior to the official exam (cf. <http://tinyurl.com/TestDaF-Gruppenkurs>). To take part in the course, participants must already have a good level of language proficiency in German, usually corresponding to the B2 or C1 levels of the CEFR. Nevertheless, the groups tend to be very heterogeneous not only in terms of their language proficiency, but also in terms of previous test and study experiences, their country of origin and previous experience with and knowledge of Germany. The course is provided via the interactive DUO learning platform. The DUO learning platform offers text, video and audio contents, a broad variety of exercise types and tools for communication and cooperation such as a discussion forum, a class chat and a co-writing tool that enable learners to exchange information in multimodal ways and actively engage with it. The platform allows multiple forms of feedback such as automated evaluation whether an answer is right or wrong, sample solutions when multiple answers are possible or individual feedback from an experienced teacher (called "tutor") for writing and speaking tasks.

The concept of the course "Gruppenkurs Training digitaler TestDaF" was developed based on a completely self-directed online training course. The self-directed course "Training digitaler TestDaF ohne Tutor" (*Training for the digital TestDaF without a tutor*) has a workload of 35 hours and is divided into five chapters, one on each test section, and a chapter that contains a test simulation allowing learners to complete all 23 tasks and experience the test with its digital interface and timing. It does not include any tasks for interaction with other participants and offers automated feedback only (right/wrong evaluation and sample solutions). Learners are completely flexible in terms of time, intensity and place of their learning, but they do not get individual feedback on their writing and speaking performance.

As opposed to the initial self-directed course without a tutor, the group course is offered with the support of a tutor. The contents and activities of this 60 hours course are organized in six chapters. An introductory chapter has been added to provide learners with information about the digital TestDaF. The activities in this chapter encourage learners to consider their preparation for the TestDaF as a preparation for living and studying in Germany in general. Each of the four chapters covering the four test sections has been enhanced with interactive tasks in the forum to promote interaction among learners in the group course. In the writing and speaking chapters, we have included a unit that focuses on the criteria used to evaluate performance in each test task. An additional peer feedback activity has been integrated in these units to increase engagement with the task and its criteria.

When designing the course, we had to decide which and how many interactive activities, including individual feedback, should be offered. Therefore, we conducted a small study in 2020 with 72 participants to analyze the perceived effect of different methods of feedback on writing and speaking performances. Participants were divided in groups of 18. Each group spent four weeks working through the 35-hours self-directed course, but the individual groups received different types of feedback for their responses given in

the practice test tasks of the writing and speaking sections. The feedback methods compared were: (1) automated non-individual feedback in the form of keywords and phrases for possible answers, (2) same as group 1 + individual feedback from a tutor, (3) only individual feedback from peers, (4) only individual feedback from a tutor.

After the course, the students were asked to take part in an online survey on their learning experience in general, how satisfied they were with the received feedback and how well they felt prepared for the test after the course. Students in group 2 and 4 felt better prepared for the test than the other groups. Those students that were offered automated feedback only (group 1) expressed that they found it helpful, but were insecure about how well they had performed and would therefore have preferred individual feedback. Students in group 3 emphasized that the criteria checklists they had received for giving feedback on other students' performances were very helpful for understanding the task and that they would have liked to have had them available already during their own task solution process. One person expressed that it would have been even better if the tutor could give their opinion after the peers' feedback and suggested including (video) chat sessions for the group. These findings correspond to the criteria of effective feedback mentioned above.

When designing the group course with a tutor, we considered various factors, including the need for individual feedback, the costs associated with offering individual feedback by experienced teachers and the responses by the 2020 study participants. We have taken into account their desire for an increased group interaction and the beneficial impact of peer feedback on learners' understanding of tasks and their engagement with evaluation criteria while they perform the role of a rater, utilize the criteria checklist, and examine other students' writing samples. To maintain flexibility, most of the activities in the group course can still be completed individually on DUO's digital platform. However, peer feedback activities, participation in forum discussions and virtual classroom meetings moderated by the tutor require coordination. To that end, the tutor provides a learning plan with a proposal for time management for students to work through all activities. This learning plan also sets deadlines for the completion of tasks in order to ensure timely feedback. The forms of feedback of the self-directed course without a tutor (automated only) were enhanced with individual feedback by the tutor and anonymous peer feedback. How students obtain individual feedback on their writing and speaking performances by tutors and peers will be discussed below.

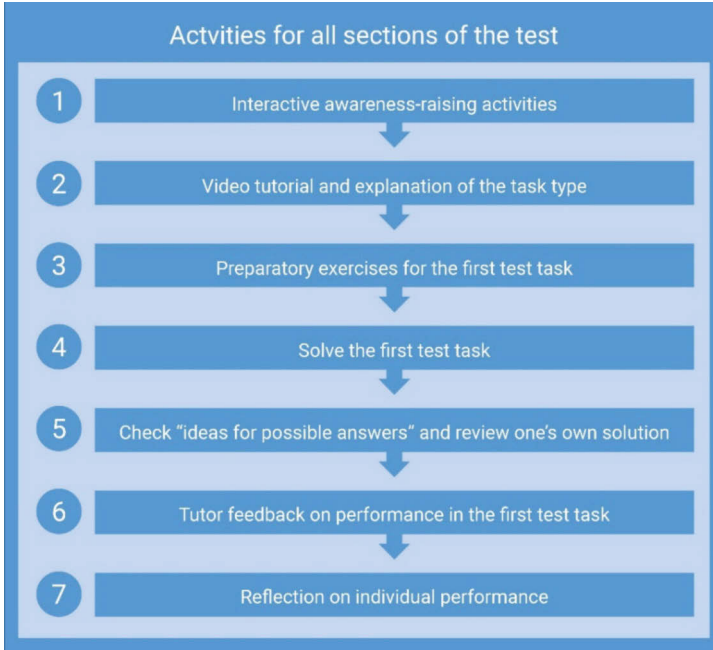
3.2. Peer Feedback Activities within the Learning Activities on a Writing Task of the Test

In this section, we will first introduce the structure of the learning units that are part of all four chapters on test sections and then explain the activities that have been added to the chapters on the writing and speaking tasks of the test, where human raters evaluate test takers' performances.

3.2.1. Learning Activities for All Sections of the Test

The following figure (Figure 1) gives an overview of the learning activities and different feedback methods that are part of all four chapters that help students prepare for the test sections.

Figure 1: Activities for All Sections of the Test



Each chapter on a test section starts with an introductory unit with interactive reflection tasks in the forum and the co-writing tool with the aim to raise awareness for real life contexts and existing individual strategies for solving this section's communicative tasks in real life (1). After that, students watch a video tutorial and read specific explanations about the test task type (2). This input is then applied to prepare for a practice test task (3). As a result, students know what they are expected to do and work on their first test task in a simulated test environment (4) and get an automatically generated non-individual feedback (5). In spite of the fact that students prefer to receive perfect sample answers, the course does not provide this kind of written and oral samples. Instead, we give them hints about the structure or potential arguments they might use for their answer in the form of key words and phrases, but not full sentences. We do this because we want to increase students' engagement and self-reflection skills, rather than push them to memorize an example of a supposedly perfect response. Students can review their own text and decide whether they want to integrate some aspects of these "ideas for possible answers". Then they submit the text/audio to receive individual personal feedback from the tutor (6). The unit closes with exercises for reflection on the individual performance in the test task (7). There is no peer feedback until this point. However, getting to know

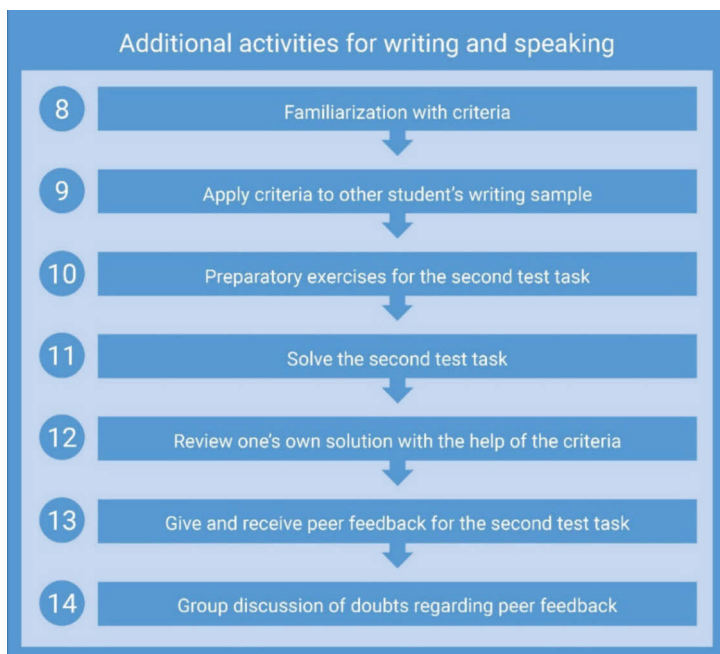
the task type properly and working through the first test task as well as the tutor's feedback on their performance familiarizes learners with the requirements of the task and prepares the ground for the peer feedback activity that will take place at the end of the second unit on each writing and speaking test task type.

3.2.2. Additional Activities for Writing and Speaking

In the following, we will describe how peer feedback has been integrated into the learning activities for writing and speaking in order to increase students' involvement. We will continue using the example of the integrated writing task. In this task type, test takers have to summarize information from a written text and a graphic with regard to a specific question.¹ Test takers have to understand the information, compare input information from both sources and decide whether the information is relevant with regard to the question. Afterwards, they have to produce a coherent written text, summarizing the relevant information correctly and in their own words.

As shown in Figure 2, the additional activities for speaking and writing focus on deepening the understanding of the rating criteria as well as on giving and receiving peer feedback.

Figure 2: Additional Activities for Speaking and Writing



1 For a demo video on this task type visit <https://tinyurl.com/Summarizing-text-and-graphic>

After having received the tutor's feedback on their performance in the first test task (steps 1–7), students take a closer look at the specific criteria for assessing this specific communicative situation (8). Research on peer feedback often recommends that learners come up with criteria on their own or discuss them among the group before applying them to each other's performances. In this specific context, shortly before the test event and with highly individual time management besides the six group meetings, it is impossible to implement this step. Furthermore, students cannot work with the actual criteria raters use since intensive training is needed to apply them. Hence, we familiarize students with learner-friendly, comprehensible criteria by using activities such as a multiple-choice quiz on the characteristics of a summary or asking them to choose between different examples of adequate or less adequate answers. They are then given automated feedback and explanations, so there is at least some kind of dialogic process in the familiarization with the criteria. The criteria presented in the course were developed in cooperation with testing experts that were involved in the development of the digital TestDaF. For the integrated writing task, the following five criteria are included:

- (1) The learner text includes information from both sources.
- (2) The information provided in the learner text is relevant for answering the question.
- (3) The information from both sources is correctly summarized.
- (4) The information from both sources is paraphrased with one's own words.
- (5) The learner text is comprehensible and includes only few mistakes.

After the engagement with the criteria, students apply them to other students' writing samples that were gathered in the 2020 study (step 9). As the screenshot (Figure 3) demonstrates, the students rate the writing sample with the help of a matrix, where they can decide whether a particular criterion is fully met, rather met, not quite met, or not met at all. There is an additional column where learners can give examples and explain their ratings. In the following learning activity, students are asked to specify what was accomplished well in the writing and provide suggestions for improvement. After completing their analysis of the text, students can compare their evaluation with a sample evaluation of a trained rater. Students then prepare for the second test task (10) and write their summary (11). At this point, "ideas for possible answers" are no longer provided in order to simulate the actual test environment. Instead, students are encouraged to check their text against the criteria before they submit it for peer feedback (12).

Before giving peer feedback for the first time, learners are familiarized with this type of activity. Peer feedback is introduced in the first virtual meeting in order to explain the concept, establish rules and build trust among the participants. The tutor explains how peer feedback works in general and asks the students about their previous experience with it and their opinion about it, i.e. what they find positive about it or if they have any concerns. The students' opinions are discussed, the rules for giving peer feedback are formulated and useful phrases are collected, in particular regarding the respectful formulation of criticism or making constructive suggestions. Only then students proceed to give feedback to others for the first time.

Figure 3: Learning Activity for Applying Assessment Criteria to a Writing Sample of Another Student

Lesen Sie die Zusammenfassung eines anderen Lernenden zur Beispielaufgabe. Ist der Text gelungen? Üben Sie, die Kriterien zur Einschätzung der Textqualität an diesem Beispiel anzuwenden.


Nachdem Sie Ihre Einschätzung eingetragen haben, können Sie im Tipp die Bewertung einer Lehrkraft ansehen.


Wählen Sie aus und schreiben Sie in die Lücke.

▼ Text eines Lernenden zur Beispielaufgabe


Das Smartphone spielt heutzutage eine wichtige Rolle in unserem Leben. Laut einer Umfrage, hat es für viele Menschen eine größere Bedeutung als, zum Beispiel, ihre Kollegen oder die anderen Bekannte. Das haben die Forscher durch den folgenden Experiment bewiesen. Die Teilnehmende haben zuerst ihre Beziehung zu dem Smartphone charakterisiert, indem sie einige Fragen beantwortet haben. Die Fragen betreffen die emotionale Verbindung des Teilnehmenden zu dem Smartphone. Dann müssten die Teilnehmenden die Person aus ihrer Umgebung und die verschiedenen Geräte je nach ihrer Wichtigkeit sortieren. Die Psychologen beurteilen es nicht wie eine Abhängigkeit, sondern als ein wichtiges soziales Phänomen. Das Smartphone kann man für verschiedene Zwecke verwenden. Die Grafik stellt dar, welche Funktionen des Smartphones von den Deutschen öfter benutzt sind. Sie zeigt, dass fast alle Menschen das Smartphone für das Telefonieren benutzen. 89% benutzen das Photokamera, 67% verbringen die Zeit in den sozialen Netzwerken. Die anderen Funktionen, wie Wecker, E-Mails und Navigation sind von circa 55% von Teilnehmern benutzt.


	trifft voll zu	trifft eher zu	trifft eher nicht zu	trifft nicht zu	Erläuterung
Der Text enthält Informationen aus beiden Quellen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Die im Text genannten Informationen sind für die Beantwortung der Frage relevant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Die Informationen aus den Quellen sind inhaltlich korrekt zusammengefasst.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Die Informationen aus den Quellen sind mit eigenen Worten wiedergegeben.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Der Text enthält nur wenige Fehler und ist gut verständlich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	


Hilfe


Tipp

unbearbeitet


Neustart


Speichern

3.3. Example of the Peer Feedback Provided in the Course

In this section, step 13 (Give and receive feedback on a second test task) will be discussed by looking at the feedback students gave to each other in a course in March 2022. The tutor encouraged each student to evaluate and give further verbal feedback to at least two texts so that students had the chance to reflect on multiple ways of solving a task and to develop more than one perspective on each performance. All ratings and comments were given anonymously.

In Figure 4 we can see that the text has been evaluated by three peers who differed in their evaluation of the text to some extent. In particular, the peer-evaluators did not agree on criterion 2, which was about the relevance of the information from both sources provided in the learner text. The course participants also answered the two open questions regarding strengths and weaknesses. One participant emphasized that the text was easy to understand, while two participants criticized that some relevant information was missing and other irrelevant information was mentioned. These disagreements were discussed in the group meeting following the activity and a professional opinion was given by the teacher in order to clear uncertainties (14).

Figure 4: Example from the Peer Feedback Given to a Writing Sample of a Course Participant. Each "x" Stands for One Student's Rating.

Text 1

Die Ozeane sind zunehmend durch große Mengen an Plastik bedroht, das zu den schwer abbaubaren Materialien gehört. Plastik ist schädlich für die Umwelt, die Gesundheit der Tiere und auch für uns, indem es zum Beispiel von Fischen oder Plankton gefressen wird und so unfreiwillig Teil unserer Nahrung wird. Aber Plastik ist nicht der einzige Abfall im Meer, 22 % sind Zigaretten, 9 % sind Flaschen, 14 % sind Lebensmittelverpackungen usw. Maßnahmen gegen diese Art der Verschmutzung müssen nicht nur von Regierungen oder privaten Organisationen ausgehen, sondern sollten bereits bei uns und den Produkten, die wir kaufen, den Dingen, die wir wegwerfen, und unserer Art, sie zu entsorgen, beginnen.

Wie gut sind die folgenden Kriterien umgesetzt?
Schreibt „x“ in Spalte, die eurer Einschätzung entspricht.

	Kriterium	trifft voll zu	trifft eher zu	trifft eher nicht zu	trifft nicht zu	ggf. Begründung/Erklärung
1.	Der Text enthält Informationen aus beiden Quellen.	xxX				
2.	Die im Text genannten Informationen sind für die Beantwortung der Frage relevant.	x	x	x		
3.	Die Informationen aus den Quellen sind inhaltlich korrekt zusammengefasst.	xxx				
4.	Die Informationen aus den Quellen sind mit eigenen Worten wiedergegeben.		xxx			
5.	Der Text enthält nur wenige Fehler und ist gut verständlich.	xx	x			

Was hat euch gut gefallen?
Schreibt eure Bemerkungen jeweils in eine neue Zeile.

Der Beitrag ist einfach und verständlich.

Was sollte noch verbessert werden? Macht möglichst konkrete Vorschläge!
Schreibt eure Bemerkungen jeweils in eine neue Zeile.

Das Thema behandelt nicht allgemeines Plastik, sondern "Mikroplastik". Außerdem gibt es keine Informationen über die kosmetische Produkte sowie Putz- und Reinigungsmittel.

Du hast Ablenkung von dem Thema "Mikroplastik und die Auswirkung auf Menschen".

4. Students' and Tutor's Perceptions of Peer Feedback

At the end of the course, we asked students to comment on their perception of the peer feedback by filling in an online survey.² When responding to the question about what they did (not) like about giving feedback on other learners' answers, several persons emphasized the positive effects of taking the perspective of a rater, since it helped them "a lot to understand what was expected" of them and "what the exact purpose of the tasks was". Furthermore, engaging with feedback helped the course participants to "better recognize [their] own mistakes and to improve faster by experiencing the evaluators' experience and coming into contact with solutions from learners who are more or less at the same level [as me]." Some altruistic aspects of helping another person to improve were listed among the positive comments. On the negative side, the students mentioned that it took them a considerable amount of time to give feedback and that "sometimes it was hard to be objective and correct mistakes properly."

2 All answers were given in German and have been translated by the authors of the chapter.

The tutor's impressions after almost two years of teaching this course confirmed the learners' statements. According to the tutor, through the process of peer feedback, participants engaged more intensively with the requirements of each task type and became thus quite aware of what exactly is expected of them. The opportunity to hear and read other learners' written and oral answers seems to be another benefit of the peer feedback activities. By comparing their own answers with those of other course participants, they seemed to be able to better assess their own performance. In addition, the texts might have given them additional ideas on possible answers and how to present their arguments. These impressions resonate with findings in former studies on the benefits of giving peer feedback (cf. e.g. Lundstrom & Baker, 2009). According to the tutor's impression, by seeing other students' answers that are difficult to understand, learners are also encouraged to critically question the intelligibility and comprehensibility of their own answers.

5. Conclusion

In this article, we reported on how we had implemented peer feedback within a six-week online group course in preparation for a high-stakes exam. The reasons for implementing peer feedback as described above were partly the desire to offer as much individual feedback as possible while keeping the participation fee affordable, but even more so the positive effects of active engagement with the criteria that we had observed when students assessed their peers' texts. With the group course design described in this article, students are offered structured, personalized and individualized feedback quickly and regularly. The feedback is also based on transparent assessment criteria, and students are actively involved in the process. Still, not all suggestions for peer feedback mentioned in the literature could be met in this short term and highly flexible online course context with participants from all over the world.

The online material of this course can also be used for courses at institutions with local students and teachers, where more time might be available and where the setting allows for more teacher-led in-class or digital meetings of the whole group. For these contexts, the design could be improved by dedicating more time to trust-building activities or the co-construction of assessment criteria and, most importantly, by encouraging further discussion about whether the received feedback was understood, by applying suggested improvements and by seeking further dialogue about the texts with peers and/or teachers.

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Tea Time: Feedback Observation within Tandem Learning

Amanda Yi Chng

Abstract *With the advent of the internet, virtual language learning has become accessible to students across the globe. One approach out of a multitude of online options is tandem learning. While this form ensures learners' autonomy, participants' reciprocity, and an equally allotted time for each language, there are several other factors involved in the execution of a fruitful tandem session. These include elements such as multimodality, synchronicity, and feedback exchange. The current literature also highlights an urgent need for learners to be trained in feedback provision. To address this, I have designed an activity for tandem learning. I put forth that the observation of feedback between students is an important component to feedback training which may promote metalinguistic discussions and generate cross-linguistic awareness – skills valuable for any language learner.*

Keywords *tandem learning; feedback observation; e-tandem; computer-mediated communication (CMC)*

1. Introduction

The concept of tandem language learning consists of two native speakers of different languages engaging in communication, with the objective of learning each other's language (Cziko, 2004). This model has evolved to include communication on web-based platforms and can be understood as a type of Computer-Mediated Communication (CMC). The benefits of this form are its low cost and wide range of multimedia possibilities (Cziko, 2004). An additional advantage about the CMC model is the option for students from different parts of the world to connect, thereby encouraging an environment for cross-cultural exchange. This is useful as learners may communicate with tandem partners and use the target language in an authentic setting.

This teaching activity is situated in a curriculum developed for students at Chemnitz University of Technology and a cooperating university in Canada. The curriculum focuses on improving students' creative writing skills via e-tandem learning as part of a Buddy Programme. The activity aims to equip learners with the necessary skills in providing corrective feedback to their German and Canadian peers. With a focus on the collaborative and participatory method (Meyer et al., 2022), the activity will concentrate on instances

of social interaction in groups (Johnson & Johnson, 1993, p. 142) while calling for individual accountability (Kramsch, 1987, p. 21; Macaro, 1997, p. 143) as students learn to provide and accept feedback.

Several terms will be used throughout this chapter. I suggest the following definitions for ease of understanding. The participants' first language (L1) in the context of this curriculum would be either German or English. The term 'source language' will be used interchangeably with the term L1. While L2 usually refers to a learner's second language, some participants might already know additional languages prior to this e-tandem session. As such, L2 is referred here more generally as the language they are learning via the Buddy Programme. Finally, the term 'target language' will be used interchangeably with the term L2. For the students in Germany, that would be the English language, and for the students in Canada, it would be the German language.

2. Literature Review

This section will explain core concepts surrounding the activity design. The teaching activity draws its inspiration from a theoretical foundation as well as from case studies. A major thread arising from these case studies is the need for learners to be trained in providing feedback (Litzler et al., 2018; La Russa & Nuzzo, 2021; Sato & Lyster, 2012; Xu et al., 2019).

2.1. Central Terms

There are three principles guiding **tandem** learning (Brammerts, 2003; Telles & Vassallo, 2006):

- (1) **Autonomy:** Each participant is responsible for setting their own goals and for managing their learning.
- (2) **Reciprocity:** Participants should benefit equally from the collaboration.
- (3) **Separate use of languages:** There should be an equal amount of practice time for each language involved.

An aspect of tandem is the use of video-conferencing tools like Skype or Zoom. This means that communication of information may take place in various **modes**. These modes can be understood as textual, aural, and visual (Guichon & Cohen, 2016). For example, the chat function in Skype represents information conveyed in the textual mode. Correspondingly, a webcam image or the shared screen function would be categorized as the visual mode.

While the definition of **feedback** has changed over the years, this teaching activity will focus on feedback as "an interactive process of exchanging information" (Schluer, 2022, p. 17). This exchange is vital for learners to deepen their current understanding in order to improve their language skills. In this case, peer corrective feedback is the reciprocal activity whereby learners provide verbal or written feedback on each other's written production (La Russa & Nuzzo, 2021).

The nature of tandem offers a mix of both formal and informal **learning environments** (Cziko, 2004). While a classroom setting might be structured, an informal environment like talking to a native speaker outside the classroom helps students use the target language as a “medium of authentic communication” (Cziko, 2004, p.25). In his paper, Cziko (2004) explains that the downside of a formal learning environment is the limited opportunity for L2 production along with limited cultural knowledge. Conversely, the downside of an informal learning environment is the lack of corrective feedback and attention to the learner’s grammar. In this light, the activity offers learners a combination of both formal and informal settings.

Synchronous activities may take the form of in-class lectures, live webinars, or instant messaging. While **synchronous** learning enables immediate social interaction, feedback, and clarification, it faces challenges in terms of scheduling and technical difficulties (Perveen, 2016). On the other hand, **asynchronous** activities may include Massive Open Online Courses (MOOC), pre-recorded video lessons, or online forums. These arrangements mean that students can work at their own pace and have ample time to engage with the material (Perveen, 2016). Asynchronous activities may also be accessible to a wide range of students. However, there is limited social interaction, and feedback or correction might be delayed.

2.2. Prior Studies

The suggested activity is inspired by the collaborative method (Johnson & Johnson, 1993, p. 139; Macaro, 1997, p. 134; Meyer et al., 2022; Richards & Rodgers, 2001, p. 192; Yang, 2023) as well as findings from three case studies. It is a type of learner-generated collaboration (Macaro, 1997, p. 138).

The first case study is a quasi-experimental project conducted by Sato and Lyster (2012). They found that peer interaction provided opportunities for repeated production practice, which contributed to fluency development. Additionally, corrective feedback helped learners to monitor both their own language production and that of their peers (Sato & Lyster, 2012). This contributed to accuracy development.

The second example proposes that peer interaction supported the development of metalinguistic reflection in learners within “peer-to-peer native/non-native online communication” (La Russa & Nuzzo, 2021, p. 87). Their study found that feedback-discussing tasks stimulated learners to actively reflect on both source and target language. This corroborates with Sato and Lyster’s (2012) findings. To take advantage of the benefits of peer interaction, the design of this activity will include interaction between L1 and L2 learners, as well as between L1 and L1 learners learning an L2. For instance, the interaction between a German learner and a Canadian learner, as well as between two German learners learning English.

Finally, Freschi and Cavalari’s (2020) analysis of a case study highlights how learners utilize the affordances of multimodality to provide feedback. The current body of literature calls attention to an urgent need for learners to be trained in feedback provision. There are several aspects that explain learners’ inhibition during feedback provision; one of which is the desire to ‘save face’ for the self and the partner, as well as an unfamiliarity with how or when corrective feedback should be given (Xu et al., pp. 337–340). In

this light, the following activity is designed to scaffold learners' understanding towards feedback.

3. Description of the Teaching Activity

The goal of this activity is twofold. Firstly, it aims to help learners engage with the feedback provided by their peers by incorporating changes into their text. Additionally, it intends to give learners a chance to observe how their peers provide feedback. This, in turn, teaches them to be feedback providers themselves. The name of this activity is "Tea Time Discussion". This activity hopes to recreate the feeling of familiarity like when a group of friends gather around for tea and snacks.

3.1. Target Group

This activity would fit well with learners who are able to articulate themselves independently. Learners should be interested in getting to know people from other cultural backgrounds as this is a feature of tandem learning. It would also be necessary that they understand the basic functions of a computer or online video-conferencing tools.

3.2. Description

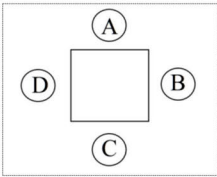
Located in session 9 of a course plan, this teaching idea would ideally be in the middle of a 15-week university semester. This ensures that feedback provision can be practiced when there is a certain level of trust among the participants. At the same time, participants will be able to build an understanding of feedback provision for subsequent sessions. The duration is stipulated at 30 minutes for group work and an extra 5 minutes for individual work. The optimal number of learners would be 16, with equal representation from Germany and Canada. The class will be divided into groups of 4, with two students from each country. The materials needed for this would be a stable internet connection, a functioning webcam and microphone, access to Word Document or Pages, and a link for the students to join via Zoom or BigBlueButton (or similar programs).

The learners will need to have gone through sessions 1 to 8 of the course. Should they have missed the previous session, they must work on their text asynchronously beforehand and bring it to class for session 9. Students will need to be prepared to edit their text.

The activity will be implemented online and students will work in breakout rooms in small groups of four persons (A, B, C, D). One student (Student A) will share his or her screen, displaying the text composed in the target language. Another student (Student C) will look through the text to provide feedback for 15 minutes, while Student A clarifies any doubts. During the 15 minutes of their interaction, Students B and D will need to observe how feedback is provided. If they would like to join the conversation, they should use the chat function. This reduces any potential disruption in the initial stages of one-to-one feedback provision (Guichon et al., 2012, p. 195). A separate feedback session may be conducted with the entire class afterwards to talk over underlying communication

issues. After this activity, another 30 minutes could be allocated to ensure that participants now communicate in the other target language (German). The aim is to generate discussions about feedback provision. Below is an example of the task instructions for this activity (Table 1).

Table 1: Task Instructions for Tea Time Feedback Observation

Step	Instruction
1.	<p>Enter the breakout room. You will be in a room with 3 other students. Label yourselves A to D.</p> <p>A (German): _____ B (German): _____ C (Canadian): _____ D (Canadian): _____</p> 
2.	A (German) will now share his/her screen.
3.	<p>- C (Canadian) will look through the text and provide corrective feedback via audio, webcam, and chat. This will last for 15 minutes, during which A (German) will clarify any questions.</p> <p>- B (German) and D (Canadian) will observe how the feedback is provided. You may provide additional corrective feedback when deemed suitable. However, you are to type it into the chat. If you think it is appropriate to jump in and join the conversation, you may unmute your microphone and do so.</p> <p><i>Note: Your language of communication should be English.</i></p>
4.	After 15 minutes, B (German) will now share his/her screen.
5.	<p>- D (Canadian) will look through the text and provide corrective feedback via audio, webcam, and chat. This will last for another 15 minutes where B (German) may ask any questions or comment on the feedback.</p> <p>- A (German) and C (Canadian) will now observe how feedback is provided and received. You may provide feedback as you wish through the chat function. However, if you would like to clarify something, you may join their conversation to add your ideas/opinion.</p> <p><i>Note: Your language of communication should be English.</i></p>
6.	After 15 minutes, you now have 5 minutes of individual time to edit your work or to reflect on the feedback process. What would you do differently? How would you provide feedback the next time?

3.3. Affordances

Studies have shown a change in language learning and attitude towards L2 in collaborative work and tandem learning (Gonçalves et al., 2020; Tian & Wang, 2010; Tolosa et al., 2017). Johnson and Johnson (1993) found interpersonal feedback to be one of the most beneficial and successful sources of feedback (p. 136). This means receiving feedback from other learners. In allowing learners to lead discussions with their peers, this activity also hopes to encourage them to be more self-directed. Learners will have a chance to decide when and how they provide feedback to their peers. They will have the opportunity to work through different modes (text, audio, visual) in order to bring their feedback across. This would promote autonomy and increase their self-awareness (La Russa & Nuzzo, 2021; Macaro, 1997, p.143).

The activity of teaching learners to provide feedback hopes to encourage them to engage in metalinguistic discussions as in the study by La Russa and Nuzzo (2021). In their study, students tapped on cross-linguistic knowledge and reflected on both their source and target languages as a result of the tandem exchange. The reflection on discussions might help students question the internalized linguistic features they have, and also observe aspects of culture embedded in the language. During feedback provision, they will have a chance to revise any errors in their understanding whilst applying similar principles in their L2.

The materials used in this activity will come from the students themselves. They will be required to compose a text in the target language during the previous session. During this activity, learners will get a chance to communicate in the target language while working to improve their texts. This will provide them with an opportunity to use the target language to achieve communicative purposes (Tomlinson, 2011, p. 15). Secondly, they will obtain corrective feedback by their tandem partners. This will expose them to the L2 language in authentic use as well as the linguistic features of the L2 (Tomlinson, 2011, pp.13–14). Finally, their self-generated peer-corrected text may become part of an e-portfolio. This will enable students to track their progress and facilitate self-investment (Malecka et al., 2022; Tomlinson, 2011, p.12).

3.4. Limitations

As much as tandem learning provides valuable benefits to learners, there are some considerations to bear in mind. Firstly, any proficiency differences within the two groups of tandem learners should be overcome. This was highlighted in a study by Tian and Wang (2010) between learners of Mandarin and of English. To achieve this, it would be good to first conduct a proficiency test for every participant and assign them groups according to their levels of proficiency.

Another study by Xu et al. (2019) brought to light six different factors to be taken into account before and during feedback provision. These are (i) provider-related factors, (ii) receiver-related factors, (iii) task-related factors, (iv) error-related factors, (v) interpersonal factors, and (vi) teacher-related factors (Xu et al., 2019, pp. 337–340). This activity is designed to consider the first and second factor by teaching learners how to provide feedback through peer observation, and raising their awareness such that they can prac-

tice it during the lesson. This activity also hopes to overcome the fifth factor by assigning learners in groups of 4 to provide and to observe corrective feedback. I recognize that some learners may be shy when it comes to providing feedback; therefore, the activity will give them the opportunity to sit back and communicate through the chat function. At the same time, these learners will be encouraged to engage with their peers through turn-taking.

3.5. Possible Adaptations for Other Learner Groups

This activity may be used in higher education. However, more scaffolding needs to be incorporated in order for participants to fully understand the expectations of the activity. A pre-activity task may be included so that they are conscious about accepting and providing feedback. For example, before going into e-tandem breakout rooms, they can discuss in small groups about situations outside the classroom where they had given or received feedback, and how it made them feel. This metatalk would raise their awareness about feedback and prepare them for the activity (Mueller-Hartmann & Schocker-von Ditfurth, 2011).

Alternatively, this activity can be done asynchronously. Groups can work on each other's texts at their own pace within a set time frame. This would be helpful for learners who are shy or unable to verbally express themselves well.

4. Conclusion

There is a wide range of possibilities where learners can be empowered to direct their own learning. Within the realms of online tandem learning, it is necessary to incorporate activities that comprise temporality (a/synchronous), modality (aural, visual, textual), bilingualism (German/English), feedback (peer-peer, facilitator-peer, peer-facilitator, training), and digitalization (via video-conferencing tools and online platforms). A major affordance of tandem learning are the cultural discussions during the exchange of languages. As Canagarajah (2012) highlights in his paper on intercultural discourse, "rather than focusing on rules and conventions, we have to focus on strategies of communication" (p.129). Indeed, we have to help learners navigate between cultures and communities as the world shifts away from one single cultural tradition. The exchange of information within tandems is thus aimed at not only improving their language skills, but also sharpen their ability to detect linguistic features (Macaro, 1997, p. 144). This way, the skills acquired can be transferred to other languages they pick up in the future.

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'Mhm okay' – Frequencies of (Non-)Corrective Feedback after Oral Errors in German as a Foreign Language (GFL) Videoconferencing

Julia Lankl

Abstract *In L2 research, only a limited number of face-to-face (F2F) studies have examined oral errors and corrective feedback (e.g., Lochtmann, 2002; Lyster, 1998; Milla & Garcia Mayo, 2021; Mori, 2002; Morris, 2002), with even fewer studies focusing on oral synchronous computer-mediated communication (SCMC) (e.g., Akiyama, 2017; Debras et al., 2015; Freschi & Cavalari, 2020; Guichon et al., 2012; Hoshii & Schumacher, 2012; Saito & Akiyama, 2017). Using video interaction analysis, this study looked at the frequency of oral errors and subsequent feedback actions in turn-taking in studio-based and desktop videoconferencing between prospective German as a Foreign language (GFL) teachers in Austria (NS) and GFL-students in Japan and Brazil (NNS). The conventional concept of feedback was expanded to include not only corrective feedback (CF) but also non-corrective feedback (NCF) in the form of listener signals. A novel coding system for NCF was created to supplement existing deductive taxonomies for oral errors (Kleppin, 1997) and CF (Lyster & Ranta, 1997). It was found that interlocutors in both settings rarely reacted with CF after oral errors and almost exclusively with reformulations, especially recasts, so that the majority of responses was non-corrective. Overlapping listener signals with the particles 'mhm' and 'okay' were most commonly used. Grammatical errors were most frequent and often appeared together with other grammatical errors. CF was utilized most often in response to rare lexical errors; the rarer the error was, the more likely it was that CF would be employed. CF routines amongst interlocutors, apart from a preference for recasts, were not observed, while individual NCF routines were seen with all GFL-teachers.*

Keywords *oral error; (non-)corrective feedback; listener signals; videoconferencing; video interaction analysis*

1. Introduction¹

Videoconferencing is now a widely employed teaching method in foreign and second language acquisition (hereafter: SLA²) and an established interaction setting in distance learning. It allows for an audiovisual exchange in oral synchronous computer-mediated communication (oral SCMC) (Loewen & Wolff, 2016, p. 166). In videoconferencing, communication between participants is technically mediated, both visually and auditorily (Hoshii & Schumacher, 2010, p. 71), with a spatial and physical distance existing between the interaction partners. In addition to traditional e-tandems (the foundational model for reciprocal distance language learning via videoconferencing in a 1:1 setting), other less static videoconferencing formats, such as studio-based or desktop videoconferencing, are increasingly being employed, with varying participant constellations (one-to-one, one-to-many, many-to-many), interaction spaces and spheres (two spaces–one sphere, two spaces–many spheres, many spaces–many spheres) (*ibid.*, pp. 78–82; Prikoszovits, 2020, pp. 125–129). As a result, interaction levels and language learning intentions of interactants (tutor-learner, learner-learner) have become more varied and flexible. For example, digital feedback in SLA videoconferencing can be presented to L2 learners in oral (microphone) and/or written form (text chat). It can refer to verbal utterances or written text products and pursue different intentions with regard to the language output of L2 learners. Thus, corrective feedback (CF) provided by teachers (interlocutors) after oral error utterances represents *one* subset of digital feedback in technology-mediated learning environments.

A review of communication in videoconferencing indicates that the use of listener signals, like the listening conversational particles ‘mhm’ or ‘okay’, are not uncommon in or incidental to long-distance verbal interactions (e.g., telephone calls, videoconferences) and, similar to short distance communication (face-to-face: F2F), their use helps to control turn-taking (Ernst, 2011, pp. 258–260). But is it possible, even after error utterances by L2 learners in digital communication formats such as videoconferencing, where language is to be taught and learned, that listener signals not only structure conversation but also take on the role of non-corrective feedback (NCF) after oral errors (OEs)? This forms the basis of the current study and leads to questions such as: Which errors are corrected? How and how often does CF appear? What NCF do interlocutors provide in videoconferencing after L2 error utterances?

1 The article was originally written in German and then translated into English, partly with the help of AI. Many thanks to S. B., who as a non-German speaking English native speaker, proofread the English article. In a further step, the article was “read back” with regard to the original German version and the preservation of the content was matched sentence by sentence.

2 The term “SLA” is used here in as an umbrella term that includes both second language acquisition *and* foreign language acquisition.

This paper presents partial results³ from a video interaction analysis of recorded videoconferencing sessions and gives insight into verbal communication and turn-taking after errors as well as outlines the range of CF and NCF used by prospective language teachers in this format. The data were drawn from an inter-university project between the University of Vienna and a university in Tokyo and São Paulo, respectively, in which prospective GFL-teachers in Austria (GFL master's program; NS) and international GFL university students in Japan and Brazil (NNS) met group-to-group for a communicative intercultural exchange on several dates over one semester via studio-based (Vienna–Tokyo) and desktop videoconferencing (Vienna–São Paulo).

Two videoconference recordings (each 60 minutes) made up the database and were used as samples for comparison. The study investigates on a micro-level the communicative interactions between the videoconferencing participants by using video-based and structured observation. It focuses on the distribution and correlation of OE and CF/NCF, an area that has not received much attention in previous CF-research in either F2F or SCMC. This research project adopts a cognitivist approach, which is characterized by two main strands of inquiry in contemporary CF-research. One is the study of CF across different SLA interaction contexts and the second is impact studies that investigate CF effectiveness. The present study expands the focus beyond *corrective* actions to include *non-corrective* reactions (listening signals/strategies) after OEs. The analysis concentrates on the distribution rather than the effectiveness of feedback. By putting attention on the modality and frequency of NCF-types (e.g., particles and interjections) provided from interlocutors after L2 error utterances in both F2F and SCMC, the study seeks to address a prevailing research gap in this area.

2. Theoretical Background

2.1. Digital (Corrective) Feedback

Digital feedback in computer-mediated communication (CMC) in SLA varies depending on the type of technical mediation, the interactants involved, and the learning product to be fed back. It can be grouped into computer-supported and computer-generated feedback and refers to either oral learner utterances or written text productions, takes place synchronously and/or asynchronously, is presented orally or in writing (Schluer, 2022, pp. 51–55), and pursues different goals with regard to learner performance. Similar to F2F language learning, digital feedback can be directed at content on the macro-level or at concrete linguistic aspects on a micro-level, be corrective or non-corrective, or used more generally as an appreciative, motivational and reflective feedback procedure.

3 This paper is based on the results of my Master's thesis at the University of Vienna (Master German as a Foreign and Second Language), which was supervised by Univ.-Prof. Dr. Karen Schramm. The contents of the study have been presented in a face-to-face lecture at the international conference "Spotlight on Language Teaching: Digital Feedback in Research and Practice" at the Technical University in Chemnitz (Germany) on June 29, 2023.

While the term feedback in SLA research generally refers to feedback on a learner utterance, corrective feedback from a cognitivist-interactionist perspective is understood as a reaction to a learner utterance that contains an error (Schoormann & Schlak, 2011, pp. 78–79). Sheen and Ellis (2011) define CF as “feedback that learners receive on the linguistic errors they make in their oral or written production in a second language (L2)” (p. 593).

In general, CF (with the error as the starting point) is considered a subset of (digital) feedback, with oral error correction in synchronous CMC (SCMC) being mainly limited to videoconferencing.

2.2. Corrective Feedback in Cognitivist-Interactionist Research

The cognitivist-interactionist approach in L2 research is linked to the individual's cognitive performance and an input-output-interaction in language learning (Schoormann & Schlak, 2012, p. 173). L2 learning is understood as a mental process of acquiring knowledge (Foster & Ohta, 2005, p. 402).

Psycholinguistic communication models like Schmidt's noticing hypothesis (1990), Long's interaction hypothesis (1983, 1996), Krashen's input hypothesis (1981, 1982, 1985) and Swain's output hypothesis (1985, 2005) are fundamental to a cognitivist understanding of SLA⁴. Long's definition of interactional negotiation of meaning in language acquisition is a key concept in the cognitivist school and assumes communication bottlenecks in the interaction between more competent and less competent speakers:

“Negotiation for meaning is the process in which, in an effort to communicate, learners and competent speakers provide and interpret signals of their own and their interlocutor's perceived comprehension, thus provoking adjustments to linguistic form, conversational structure, message content, or all three, until an acceptable level of understanding is achieved.” (Long, 1996, p. 418)

As such, oral error and corrective feedback are central concepts and established cognitivist-interactionist terms. From this perspective, attention is focused on the reaction of the interlocutor in an institutionalized context (for error correction to take place, the interlocutor must first perceive the utterance as an error to be corrected). Conversely, sociocultural theory regards SLA as a social, co-constructing process that includes self-correction or corrections among L2 learners in terms of a shared, dynamic utterance construction (Aguado, 2010, pp. 817–818; Hoshii, 2013, pp. 112–113).

4 These sources have been cited by Aguado (2010, pp. 818–820) and Schoormann and Schlak (2011, pp. 47–49), who also provide a more detailed overview of interactionist-cognitivist language acquisition hypotheses.

2.3. Oral Error

In L2 research, the classical concept of error⁵ is deficit-based and errors are understood with a view to target language adequacy as deviations from norm-compliant forms (Settinieri & Jeuk, 2019, p. 7). The cognitivist error-concept is closely interconnected with that of correction; errors require correction and utterances that deviate from the target language's ideal, due to a violation of linguistic norms, require correction to improve the language proficiency of L2 learners (Havranek, 2002, pp. 23–24).

The idea that error prevention is a key goal of interaction in language teaching is also reflected in CF-research as a three-step linguistic interaction pattern (error–CF–learner uptake). In addition to a deficit character, errors are also characterized by an interactional component; only if it is noticed by the interactional partner(s) as an error and is treated as such, will it be considered as an error (Hoshii, 2013, p. 114):

“We understand errors to be the perceived and/or designated deviations from the linguistic system or from an expected utterance or sequence of utterances. [...] The criterion for designating a linguistic utterance as an error is no longer the language system or the language use alone, but the linguistic utterance, through the lens [of the interlocutor, Ed.]” (German quote from Kleppin & Königs, 1991, p. 16, translated by the author JL)

This places the teacher in the L2 classroom as the final authority on whether a verbal utterance is called an error or not. Accordingly, an OE can be perceived as correct by the interlocutor and, conversely an objectively correct learner's utterance can be deemed a linguistic deviation by the teacher and as such an *error*. Conceptualized this way, an error is that which a teacher calls an error (Kleppin, 1997, pp. 16–19).

Regarding reference norms against which errors can be measured, Kleppin (1997, pp. 19–21) cites, in addition to the language system or the linguistic norm (linguistic correctness), the communicative norm (comprehensibility) and the pragmatic norm (situational appropriateness) as benchmarks. Blex (2001, p. 4) conceptualizes a hierarchization of *error severity*, with errors measured against the criteria of acceptability, irritation, and comprehensibility, and weighted according to frequency and generality of rule violations.

Historically, OEs were classified as mistakes (performance errors) versus errors (competence errors) (Corder, 1967, pp. 166–167), or slips, errors and attempts (Edge, 1992, pp. 9–11), or differentiated into global errors, which substantially impair comprehension, versus local errors, which only slightly impede communication (Burt & Kiparsky, 1980, p. 6). Contemporary CF-research has adopted the use of *error* to signify OE (e.g., Mackey, 2020; Nassaji & Kartchava, 2017), with the cognitivist definition of CF as “response[s] to learner utterances that contain an error” (Ellis et al., 2006, p. 340) being firmly established. Kleppin (1997, pp. 42–43) presents a five-part error classification according to linguistic areas, which is divided into phonological, morphosyntactic, lexical-semantic, pragmatic, and content errors. Other CF-research groups errors into

5 The error concept refers exclusively to the *oral* error, although in some cases references or definitions are also valid for written errors.

grammatical, vocabulary, and pronunciation errors (Havranek, 2002, p. 98). A three-part coding into grammatical, lexical, and phonetical errors is the dominant taxonomy in current CF-research (e.g., Brown, 2016; Lyster, 1998; Saito & Akiyama, 2017). This coding model reaches its limits when multiple errors from different linguistic areas occur in one L2 utterance (Lyster & Ranta, 1997, p. 45).

2.4. Taxonomies of CF and NCF

Lyster and Ranta's (1997) classification model continues to be widely cited within the CF domain. It classifies CF into six different types (recast, explicit correction, clarification request, metalinguistic feedback, elicitation, repetition). The six CF-types are further divided into "reformulations" and "prompts" (Ranta & Lyster, 2007, p. 152), and "input-providing" or "output-prompting" (Sheen & Ellis, 2001, p. 594), or "model-providing and eliciting correction strategies" (German quote from Schoormann & Schlak, 2012, p. 174, translated by the author JL). Recasts and explicit corrections are reformulations, with the interlocutor providing the correct utterance, while the remaining four CF-types (prompts) seek the correct utterance from the L2 learner themselves, thus promoting self-correction. Other scholars advance models that distinguish between explicit and implicit feedback (Ellis et al., 2006) and between didactic (explicit) and conversational (implicit) recasts (Sheen, 2006, p. 365; Sheen & Ellis, 2011, p. 594).

To include non-corrective reactions after oral error utterances as part of linguistic interaction in a turn-taking system (Sacks et al., 1974), where non-corrective feedback (NCF) is defined as *any* reaction other than CF that is given by the interlocutor during or after an oral error utterance by a L2 speaker, an NCF classification scheme was needed. An NCF system registers links between error utterances and non-corrective responses and systematizes linguistic properties in such a way that morphological and temporal dimension as well as communicative function are considered.

If one repurposes Kleppin and König's (1991) book-title "Tracking the correction" (translated by the author JL from the German original title "Der Korrektur auf der Spur") to focus on NCF, "Tracking the non-correction" if you like, one might quickly become aware of conversational particles and interjections on the listener's side (Wöllstein & Dudenredaktion, 2022, pp. 893–899). Crucially, not only the speaker, but also the listener participates in an active way in the success of the conversation (*ibid.*, p. 893):

"The listener is also considered to have certain possibilities of controlling the conversation – e.g., by commenting on, agreeing with, or rejecting what is said; they can send out certain signals which the speaker, in turn, can process and react to." (German quote from Ernst, 2011, p. 560, translated by the author JL)

Listener signals work on the conversation-structuring level, to organize and maintain conversation as well as to convey attention, understanding at the content level, or to evaluate the speech contribution of the other person (Wöllstein & Dudenredaktion, 2022, p. 886). They can operate contemporaneously with the utterance of the interlocutor or be utilized responsively to mark a transition-relevant place (TRP) and to initiate the change between the speaker and listener roles (e.g., Imo & Lanwer, 2019, pp. 173–174).

Rehbein (1979, pp. 59–60), in the context of linguistic interaction and the use of listener-sided particles, writes about the notion of “speaker control by the hearer”⁶ and “means by which the hearer influences the utterances of the speaker”, while the Duden Grammar (2022, p. 887) uses the terms “hearer-controlling” and “hearer-sided particles”, dividing them into two classes: hearer-sided conversational particles and interjections (Table 1).

Table 1: Classification of Listener-Side Conversational Devices in the Current German Duden Grammar (Wöllstein & Dudenredaktion, 2022, pp. 893–898)

Listener-sided Conversational Particles	Communicative Function	Examples (German)
receptive particles	listening, attention, speaker support	hm, hm, ja, okay
comprehension particles	understanding → interjections used frequently	ach, ah, aha, ach so, ja, ach ja
evaluation particles	reinforcement, empathy → interjections used frequently	gut, super, geil, ui, au, boah, wow, ach du scheiße
responsive particles	agree/disagree, reply	ja, nein, doch
Interjections	expression of emotions, evaluation (expressive character) e.g., astonishment, surprise, admiration, relief, joy, regret, disappointment, pain, disgust, contempt, anger, ridicule, doubt, etc.	aha, oha, ui, juhu, uff, hach, oje, pfui, au, puh, ätsch, nanu, igitt, pff, oh, uff, olala, ups, bäh, uh, phh, wow, hui

Due to multiple overlaps and a fuzziness in the classification (Table 1), delimitation problems arise when separating listener-sided conversational particles and interjections.

Weinrich (2005, pp. 834–841) offers a tri-partite classification, one that distinguishes between listener signals, which include support signals (‘hm’ or ‘mhm’) and signal attention to the speaker, and takeover signals, as well as so-called dialogue particles, which are equivalent to the listener-sided conversational particles in the Duden but are not further differentiated.

A crucial feature of listener-sided conversational particles or interjections are the prosodic elements, such as rising/falling pitch, elongation, accentuation, loudness, etc. (Wöllstein & Dudenredaktion, 2022, p. 886). This results in the special feature of multi-functionality in listener signals, which Ehlich (1979) explored in his research on the parti-

6 In this paragraph, the terms and phrases placed within quotation marks have been translated from German by the author JL.

cle 'hm'. He identified, depending on the phonological realization, a manifold, meaning-different usage of that particle:

"It is obvious [...] that there are different forms of 'hm' (with different functions), one of which can by no means simply be replaced by the other. [...] It is further obvious that the various realizations of 'hm' differ in their intonation." (German quote from Ehlich, 1979, p. 504, translated by the author JL)

In the absence of an NCF-classification, a new approach and reconsideration of NCF-coding after OEs was warranted, one that would introduce a temporal dimension to the morphological and illocutionary function. A key question was whether to focus exclusively on the word level (particles, interjections) or also to include discursive functions at the sentence level (e.g., topic continuation, change of topic, back-questions to the topic, etc.) in the definition of NCF.

2.5. Videoconferencing as Interaction Context

Computer-mediated communication (CMC) is grouped into written, oral, and oral-visual interaction and into synchronous and asynchronous communication (Wang, 2004a, pp. 375–376). Synchronous computer-mediated communication (SCMC) distinguishes between text-based (e.g., text chat), audio-based (e.g., voice chat), and video-based interaction, and combination forms (e.g., audiovisual videoconferencing with text chat) (Rassaei, 2017, p. 134). In the context of digital interaction, Schluer (2022, p. 55) distinguishes between technology-generated feedback (e.g., automated text correction, chatbots, robots) and technology-mediated feedback formulated by actual people (e.g., in videoconferences). Further technology-mediated communication environments are categorized in oral SCMC and written SCMC:

"Synchronous computer-mediated communication (SCMC) can be defined as communication that occurs in real time by means of a computer, and it may be either written or oral. An example of written SCMC is a chatroom in which two or more participants are typing and posting messages concurrently, while oral SCMC can take the form of Skype or some other audiovisual computer-mediated communication." (Loewen & Wolff, 2016, p. 166)

Communication in videoconferencing is mediated technically and auditorily and is characterized by physical distance between the interaction partners (Hoshii & Schumacher, 2010, p. 71). Two or more spatially separated communication partners interact with each other from two or more interaction spaces. In terms of the number of interaction spaces and interactants, a distinction is drawn between desktop and studio-based videoconferencing (Wang, 2004b, p. 93), and the interaction settings: one-to-one, one-to-many, many-to-many (Wang, 2004a, p. 375). Historically, the term studio-based videoconferencing was more associated with an audiovisual delivery of lectures in institutional contexts or with group-to-group videoconferencing and the interaction of two groups in two interaction spaces. By contrast, desktop videoconferencing was traditionally understood

as 1:1-settings (e.g., e-tandems) also consisting of two interaction spaces. Since the pandemic, there has been a change in terminology, as desktop videoconferencing has come to encompass a learning environment in which

“each conference participant interacts from his/her own enclosed interaction space (in this case, own rooms, apartments, houses). There are consequently as many interaction spaces as there are conference participants” (German quote from Prikoszovits, 2020, pp. 128–129, translated by the author JL).

Hoshii and Schumacher (2021, p. 19) speak of it as a common virtual interaction space characterized by a shared sphere of interaction.

3. Previous Empirical Studies

3.1. Literature Review

CF-research in SLA contexts has traditionally focused on F2F-settings in the classroom or laboratory, but since the early 2000s there has been an increased interest in SCMC. CF-research into technology-mediated interaction was initially focused on written SCMC (e.g., Baralt, 2013; Fernández-García & Martínez Arbeláiz, 2003; Gurzynski-Weiss & Baralt, 2014; Kim, 2014; Kourtali, 2022; Sachs & Suh, 2007; Sauro, 2009; Sotillo, 2005; Yilmaz, 2012). More recent research has expanded the focus to include *oral* interaction in videoconference-based language learning (oral SCMC) (e.g., Akiyama, 2017; Bryfonski & Ma, 2020; Debras et al., 2015; Freschi & Cavalari, 2020; Guichon et al., 2012; Hoshii & Schumacher, 2012, 2017; Monteiro, 2014; Parlak & Ziegler, 2017; Rassaei, 2017; Renner, 2017; Saito & Akiyama, 2017; Yanguas, 2010). Similar to CF-research in F2F, the same two focus areas are seen in the SCMC field:

- a) impact studies that investigate the effectiveness of CF, and
- b) studies that are limited to the CF-type recast.

Moreover, a particular focus on e-tandems as one-to-one-interactions is observable across SCMC-research.

As with F2F, SCMC-research favored a cognitivist-interactionist approach, one that interprets communication according to a sender-receiver principle and follows a three-step interaction matrix: (1) OE, (2) CF, and (3) learner uptake. By contrast, empirical studies from a sociocultural perspective about co-constructive or multimodal negotiation of meaning in videoconferencing are fewer in number (e.g., Arellano-Soto & Parks, 2021; Cappellini, 2016; Hampel & Stickler, 2012; Hoshii & Schumacher, 2017, 2021; Kühschelm, 2019).

Research that provides statements on error and feedback frequencies and the relationship between these two variables are rare, both in the F2F context (e.g., Lyster, 1998; Mori, 2002; Morris, 2002) and in the oral SCMC domain (e.g., Debras et al., 2015; Guichon et al., 2012; Saito & Akiyama, 2017).

If the question is, 'What do we already know?' about frequencies and correlations of OEs and CF, results of distribution studies⁷ and meta-analyses show that the CF-type recast is the one most frequently used by interlocutors in F2F contexts (45–57%), with other prompts accounting for 29.5–35% of CF and explicit corrections 9.7–14% (Brown, 2016, p. 445; Lyster et al., 2013, p. 6). By contrast, in NNS-NNS peer-interactions, prompt rates are significantly higher, and elicitations or clarification requests are used more (Foster & Ohta, 2005, p. 417; Iwashita, 2001, p. 276).

In distance language learning in e-tandems (oral SCMC), CF distribution follows a similar pattern to F2F with the recast being the dominant CF-type (50–72%). In contrast to F2F, e-tandem partners almost exclusively use reformulations (recasts, explicit corrections) that provide the target language form ($M=95.5\%$) and use prompts, if at all, as clarification requests ($M=4.5\%$). The use of other prompt-types (metalinguistic feedback, elicitation, repetition) is entirely absent (Akiyama, 2017, p. 67; Debras et al., 2015, p. 18; Freschi & Cavalari, 2020, p. 169; Hoshii & Schumacher, 2012, pp. 65–66). The results on CF distribution in e-tandems are consistent and seem typical for this language learning environment. In interviews on feedback techniques in e-tandems, participants expressed a desire to be corrected and cited recasts as the most appropriate CF-strategy for videoconferencing. This is because they are timely, time saving, unobtrusive, and easy to provide (Akiyama, 2017, p. 68). Furthermore, the peer-to-peer nature of e-tandems interactions affects the choice of CF-types: "[T]he preference for recasts can be attributed to the fact that participants viewed themselves as a friend rather than a tutor" (Freschi & Cavalari, 2020, p. 163).

Little research provides data on the frequency of linguistic categories of OE-types by L2 learners. In F2F-research, two studies found that grammatical errors occurred most frequently in L2 utterances. In French immersion classes, Lyster (1998, pp. 198–200) observed grammatical errors to be 50%, while lexical and phonetic errors accounted for fewer than 20% each. Morris (2002, p. 400) found grammatical errors (63%) to be more common than lexical errors (30%) in NNS-NNS peer interactions. In contrast, Saito & Akiyama (2017, pp. 59–61) identified high frequencies of phonetic errors (54%) and fewer occurrences of grammatical (39%) and lexical errors (6.5%) in NS-NNS videoconferencing dyads. Despite an inconsistent error distribution, there is an important overlapping finding in all three studies regardless of the language learning context. Lyster (1998), Morris (2002), as well as Saito and Akiyama (2017) observed that the more often an oral error occurs the less it is corrected, and that conversely, the less often an error occurs the more often it is corrected. Chaudron had already observed this phenomenon of indirect proportionality between error and correction frequencies by the late 1980s:

"The trends for proportion of errors corrected [...] appear to reflect the general rate at which errors are made in classrooms, in an inverse relationship, where the more a type of error is made, the less likely the teacher appears to be inclined to correct it." (Chaudron, 1988, p. 140)

7 A detailed overview about empirical studies on the distribution of oral errors and corrective feedback in F2F and oral SCMC contexts can be found in my master's thesis (Lankl, 2023, pp. 42–57).

Several studies have focused on which error-type was corrected the most and presented frequencies of CF or how often certain linguistic error-types were corrected. From the overview of results, it can be deduced that – contrary to Lyster (1998) and Morris (2002), who reported low CF rates for frequently occurring grammatical errors – grammatical CF was found to be the most frequently occurring (Blex, 2001; Kleppin & Königs, 1991; Havranek, 2002; Ellis et al., 2001; Lochtman, 2002; Mackey et al., 2000). The data also show that CF tends to address phonetic errors of L2 learners less often. Similarly, Brown's (2016, p. 446) meta-analysis finds a significantly high mean for grammatical CF (43%) and lower frequencies for lexical CF (28%) and phonetic CF (23%).

A consistent picture emerges for overall correction rates. On average, OEs are corrected much less often in videoconferencing (oral SCMC) than in the L2 classroom (F2F). From the data of 13 studies in different F2F settings and target groups, a mean of 55% overall correction rate of OEs was established (Lankl, 2023, pp. 151–152), whereas in oral SCMC low correction rates were evident, with 13–43% of all OEs corrected (Akiyama, 2017, p. 67; Saito & Akiyama, 2017, pp. 59–60). Research interprets the low correction rates in videoconferencing as follows:

“Maintenance of conversational flow and the fear of interrupting or of being interrupted are aspects of the computer mediated interactional phenomenon [...] Moreover, avoiding communication breakdowns and face-threatening situations is an aspect of the CMC phenomenon that can be influential in quantity of corrective feedback.” (Zourou, 2009, pp. 13–14)

As to what extent error-types correlate with certain CF-types, the data show that phonetic errors are more likely to be responded to with recasts, with lexical errors rather being met with prompts, while grammatical errors primarily elicit recasts (e.g., Havranek & Cesnik, 2001; Lochtman, 2002; Lyster, 1998; Mackey et al., 2000; Milla & García Mayo, 2021; Morris, 2002; Nabei & Swain, 2002). In terms of effectiveness (learner uptake), Lyster (1998, p. 208) considers recasts after phonetic errors and prompts after lexical and grammatical errors to be the most effective options.

As for available data on frequencies of NCF after OEs, there is little and only a few facts to which this study can refer. After the nonverbal nodding of the head, the most frequent verbal listener signals are the reception particle ‘hm’ or ‘mhm’ and the response particle ‘ja’ (Wöllstein & Dudenredaktion, 2022, p. 893). There is also empirical evidence that conversational particles very often occur in tandem or in combination with each other (ibid., p. 887). Weinrich (2005, pp. 834–836) confirms this distribution and describes ‘mhm’ or ‘hm’ as the most frequent support signal and ‘ja’ as the most frequent dialogue particle in German.

3.2. Research Desiderata

With the focus of SCMC CF-research on e-tandems, other videoconferencing settings have been somewhat neglected. Although theoretical explorations of group-to-group videoconferencing, such as studio-based or desktop videoconferencing (e.g., Hoshii & Schumacher, 2010; Prikoszovits, 2020), are taking place, the distribution of CF in

studio-based videoconferencing (e.g., Hoshii & Schumacher, 2012) and desktop videoconferencing (e.g., Guichon et al., 2012) has not been widely studied so far. Almost no comparative work on linguistic interactions in these two videoconferencing formats (e.g., Hoshii & Schumacher, 2021) is available and empirical data and correlative statements on oral error and feedback frequencies do not exist.

This gap in cognitivist SLA research into the interactions that surround OEs in different videoconferencing settings warrants attention. It is remarkable that CF-research only considered *corrective* reactions after OEs on the listener side and completely ignored *non-corrective* reactions in the form of conversational particles or interjections. Consequently, findings on NCF-frequencies after OEs are missing. Those aspects led to the two main research questions of the study:

- (1) How do errors and feedback occur in the turn-taking of the interactants in studio-based and desktop videoconferencing?
- (2) To what extent do oral error frequencies correlate with frequencies of corrective and non-corrective feedback?

Given the absence of research on type and manner and frequencies of NCF after OEs, this paper will focus on presenting results on this topic.

4. The Present Study

4.1. Participants

The video interaction analysis is based on 120 minutes of recorded videoconferencing data. There was a total of 16 participants, which included GFL-university students (NS) in Austria (N=4) and GFL-university students (NNS) in Japan or Brazil (N=12)⁸. Two 60-minute videoconferencing sessions were taken as comparison samples. In the first, prospective GFL-teachers in Vienna (N=2) interacted with L2 learners (N=5) in Tokyo group-to-group in studio-based videoconferencing. In the second sample, prospective GFL-teachers in Vienna (N=2) interacted with L2 learners (N=7) in São Paulo via desktop videoconferencing (see Table 2 for details).

The videoconferences were created as part of a collaboration project between the University of Vienna, Waseda University of Tokyo, and the University of São Paulo⁹. For one semester, the students in Vienna met in small groups for one-hour sessions on several dates for a communicative exchange with the Japanese and Brazilian GFL-learners. The

8 The students in Vienna studied in the Master program "German as a Foreign and Second Language" and can be regarded as prospective teachers for German as a Foreign Language. The students in Japan and Brazil were involved in different study programs and learn German as a Foreign Language.

9 Prikoszovits (2020) provides information and describes in detail the interaction formats that were used, and the procedure of the videoconference collaboration project named 'Go Global', which was embedded in the "German as a Foreign and Second Language" Master program of the University of Vienna 2019/20.

participants on both sides moderated the videoconferencing sessions, during which various cultural-reflective topics were discussed. Visual and auditory stimuli and aids (e.g., pictures, videos, PowerPoint, audio contributions, quizzes, surveys, etc.) were employed during the meetings. In addition to videoconferencing, participants used the communication platform 'Slack' for written exchange outside the meetings.

Table 2: Data Corpus

	Studio-Based Videoconferencing	Desktop Videoconferencing
	Vienna-Tokyo	Vienna-São Paulo
recording time	12/2019	5/2020
conference number	4/7	4/5
duration of the recording	60 minutes	
interaction partners	prospective GFL-teachers – GFL university students teachers (NS) – learners (NNS)	
number of participants	N=7 teachers (n=2) – learners (n=5) Vienna Tokyo	N=9 teachers (n=2) – learners (n=7) Vienna São Paulo
interaction level	experts (NS) – novices (NNS) (tutor-learner) university students – university students (peer-peer)	
language learner level	A1-B1	A2-C2
number of interaction rooms	2	9
interaction setting	many-to-many group-to-group	one-to-many shared virtual interaction space
topic of conversation	Working World in Austria	Films and Literature in Austria and Brazil
moderated by	GFL-teachers (Vienna)	
declaration of consent	in advance	afterwards

The videoconferencing formats, as technology-mediated learning environments, differed in the two samples (Figure 1, 2)¹⁰.

The language learning intention for both samples was with the L2 students in Japan (beginners) and Brazil (intermediate level). The interaction level between the prospective GFL-teachers in Vienna and the Japanese and Brazilian GFL-learners was ambiguous, since on the one hand experts (NS) and novices (NNS) interacted with each other (language level: tutor–learner), while on the other hand both groups were students (social level: peer–peer). All of the prospective GFL-teachers in Vienna had little to no teaching experience at the time of the recordings. They did not receive any specific CF-training in advance because the study was developed after the conference recordings.

10 The pictures from Figure 1 and Figure 2 were sourced from Prikoszovits (2020, pp. 127–129).

Figure 1: Studio-Based Videoconferencing (Vienna–Tokyo): GFL-Teachers in Vienna (above) and GFL-Students in Tokyo (below)

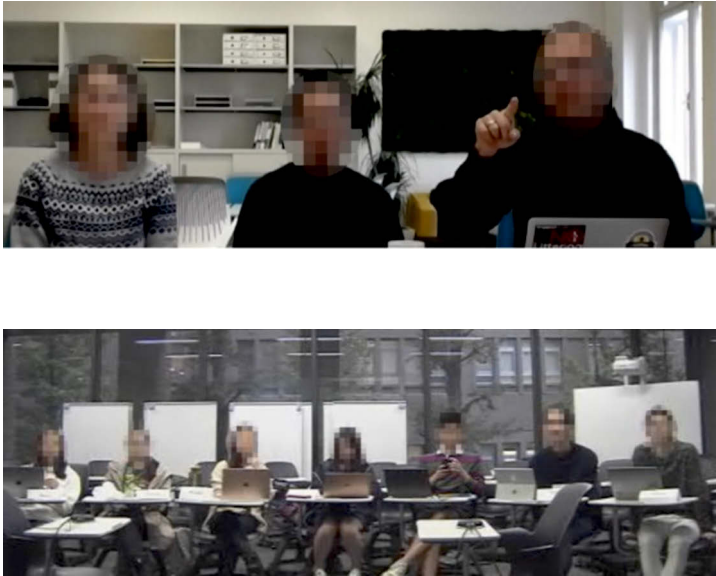
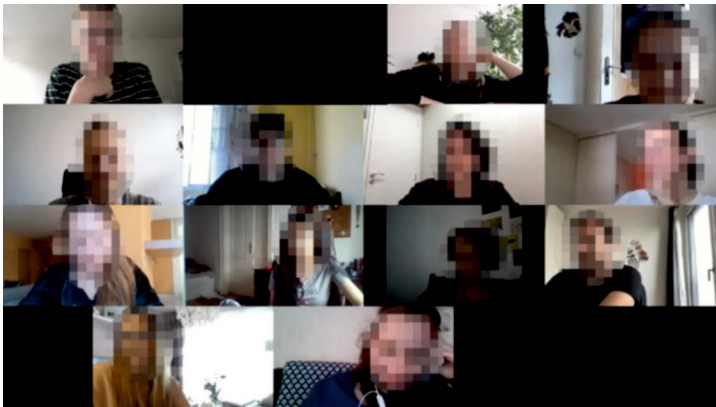


Figure 2: Desktop Videoconferencing (Vienna–São Paulo) between GFL-Teachers (Vienna) and GFL-Learners (São Paulo) in a Shared Virtual Interaction Space



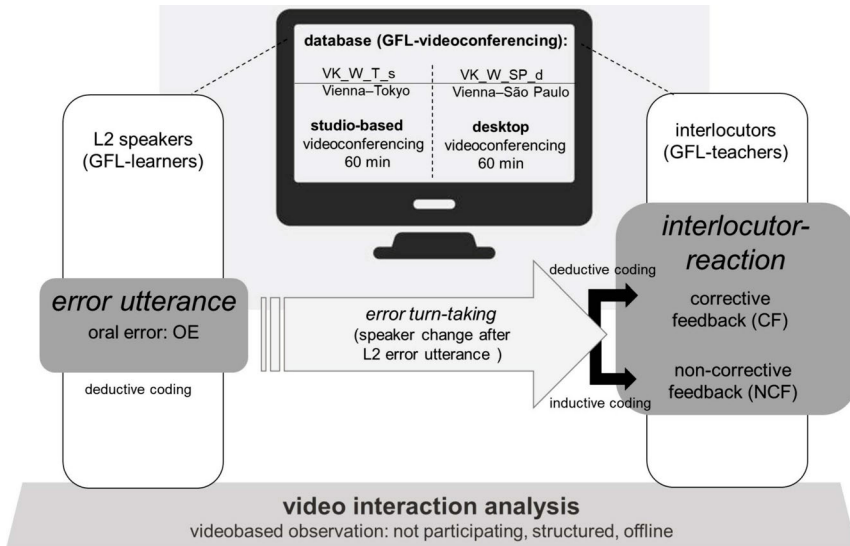
4.2. Methodological Framework

The methodology followed video-based L2 interaction research and took a descriptive approach, applying a theory-based event sampling and searching of the data corpus for observable phenomena. The unit of analysis was error turn-taking¹¹ between L2 learners

11 The term "error turn-taking" denotes a speaker change, one initiated by an interlocutor's reaction after or during an L2 utterance, in which they assert the right to speak. The

and GFL-teachers (interlocutors). OEs in utterances of the L2 speakers (error utterance) and the subsequent reactions of the GFL-teachers (interlocutor reactions) by means of CF or NCF were considered as observational phenomena (events) and constituted the focus of interest. The study aimed to shed light on the sequential interplay between error utterance (action) and interlocutor reaction (reaction) in verbal interaction processes between L2 speakers and interlocutors (Figure 3).

Figure 3: Research Design



The research questions were as follows for both samples (studio, desktop):

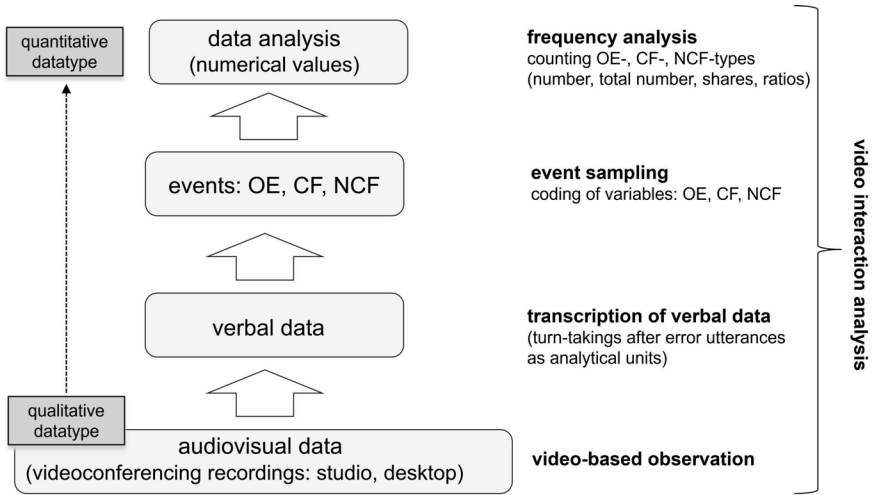
- (1) How does the videoconferencing format influence turn-taking structures after L2 error utterances?
- (2) What is the distribution of oral errors in L2 utterances?
- (3) Which reactions of interlocutors appear after L2 error utterances? What is the distribution of corrective feedback and non-corrective feedback?
- (4) How are non-corrective feedback-types realized?
- (5) What correlations exist between oral errors and (non-)corrective feedback?
- (6) What feedback routines do the interlocutors employ?

The study quantified events from audiovisual observation data and generated findings on frequencies and correlations of the variables OE, CF, and NCF. From a non-involved external perspective, the aim was to translate observed reality into numbers (Schmelter, 2014, p. 37). The qualitative research design combined two methodological approaches as

terms “L2 error utterance” and “error turn” are used synonymously. Studio-based videoconferencing is replaced by “studio” and desktop videoconferencing by “desktop”.

a parallel design and integrated a quantitative paradigmatic basis by converting verbal communication phenomena from qualitative data material into numerical values (Figure 4).

Figure 4: Change of Data Type and Methodical Process Steps



For the video interaction analysis, video-based observation was used as a methodological tool for data collection, which can be characterized as open, structured (also: systematic), non-participatory, and offline (Ricart Brede, 2014, pp. 137–139). The observation took place in the natural field of group-to-group videoconferencing and can be considered as stringently monitored. The coding strategy employed event-sampling, which seeks to quantify observed events. Generally, the identification of error-types and feedback-types is marked by a high level of inference and demands sophisticated interpretive power in analytic decisions within the sampling process (Schramm & Schwab, 2022, p. 154).

The study followed an etic perspective, which, in contrast to the emic perspective, is not interested in the external understanding of the research partners' internal view, but already presupposes a certain theoretical understanding of the object of study to be observed and consistently applies it to it (ibid., p. 148). Due to the partially elaborated state of CF-research statements on error and CF distribution, it was possible to follow a hypothesis-testing approach. However, the research design cannot provide causal relationships, but can only describe frequencies and correlations of the variables OE, CF and NCF.

Error turn-taking was defined as the unit of transcription and analysis in the video-conference recordings. For the variables OE and CF, theoretical coding schemes were available, whereas for the NCF domain, coding was developed inductively from the material. The coding of OEs, CF, and NCF was performed separately for each sample and the frequency values obtained were then compared to identify any differences in the two specific videoconferencing formats.

4.3. Data Analysis

For data processing, each error turn-taking was marked as an interaction sequence. A prototypical speaker change after an oral erroneous L2 utterance was divided into three steps: (1) input (interlocutor), (2) error utterance (learner), (3) feedback/reaction (interlocutor) (Table 3).

Table 3: Prototypical Analytical Unit

VC_V_SP_d/12	
GFL-teacher: Vanessa, wirst du sagen- hast du Christoph Walz gekannt' zum&Beispiel- Vanessa, would you say, did you know Christoph Walz, for example?	= input (interlocutor)
GFL-learner: (.) Äh:, ich habe: (.) ihren Name' in einem: Musiklyrics- gehört' Ahm, I have heard her name in a music lyric.	= error utterance (learner): OE
GFL-teacher: O:kay? (.) wirklich. Okay? really.	= feedback/reaction (interlocutor): NCF ▼

The transcription method¹² considered paralinguistic means of communication (e.g., volume, pitch, speech melody, tempo, laughter) and timing as factors (overlapping of speech, score writing). Non-verbal speech acts or self-corrections of the L2 learners were not included in the data analysis.

The selected interaction sequences were searched for the variables OE, CF, and NCF at a micro-level in a four-step event sampling and multiple material process. After an initial precoding of all three variables in the transcripts, separate detailed coding for OEs and CF/NCF was undertaken. Thereafter, the frequencies and correlations of OEs, CF, and NCF were merged in a final coding overview. The iterative-cyclical (Settinieri, 2014, p. 58) small-step approach to data preparation, which compares and references the individual coding runs (Mayring, 2015, pp. 97–99), increased the accuracy and reliability of the data (ibid. pp. 128–129). The coding procedure was applied identically and independently for both samples. Data triangulation by cross-comparison of two different data sets (studio, desktop), which were collected using the same method (within method), supported the internal consistency and validity of the results (Lamnek, 2005, p. 278, Settinieri, 2015, pp. 20–23).

12 The model by Fuß and Karbach (2019, pp. 40–57) was largely adopted as the transcription method.

4.4. Coding

Event sampling focused on frequencies and correlations of the variables OE and CF/NCF (Table 4).

Table 4: Coding Categories

		Coding Categories				
1	videoconference					
2	event-nr.					
3	time (h/min/s)					
4	speakers					
5	<i>single error</i>	OE-style	Oral Error	error utterance (L2 learners)		
6	<i>uniform error</i>					
7	<i>multiple error</i>					
8	gram	OE-type (Blex, 2001; Kleppin, 1997)				
9	lex					
10	phon					
11	gram-lex					
12	gram-phon					
13	lex-phon					
14	recast	CF-type (Lyster & Ranta, 1997)			Corrective Feedback	interlocutor reaction (GFL-teachers)
15	explicit correction					
16	clarification request					
17	metalinguistic feedback					
18	elicitation					
19	repetition					
20	listening overlap	NCF-type	Non-Corrective Feedback			
21	expressive overlap					
22	listening final					
23	responsive final					
24	expressive final					
25	topic continuation					
26	totally ignored	<i>no reaction</i>				
27		<i>sequential feedback</i>				
28	OE-CF	<i>correlations</i>				
29	OE-NCF					

OEs were separated into two coding categories. *OE-style* refers to the number and linguistic category of errors in an L2 utterance, for which a triple coding (single error, uniform error, multiple error) was used. Single errors denote one error occurring in one L2 utterance, while uniform errors indicate more than one error ($n > 1$) of the same linguistic category (e.g., 3 x gram) in one learner utterance, whereas multiple errors represent two or more errors from two different linguistic categories (e.g., gram-lex). Utterances with errors from three linguistic areas (gram-lex-phon) were not coded. *OE-type* includes the linguistic level of the error(s). Here, a 6-tiered coding (grammatical, lexical, phonetic, grammatical-lexical, grammatical-phonetic, lexical-phonetic) was used, which comprises two linguistic categories (multiple errors). The 6-tiered coding of error-types was designed in such a way that even if several errors of the same linguistic category occurred numerically in a learner utterance, these were coded together into a single error category. This way, a 1:1 relation between error-type and reaction-type can be established.

The OE-coding was based on an error classification according to linguistic categories (grammatical, lexical, phonetic), as defined by Kleppin (1997, pp. 42–43), as well as its extended operationalization, as suggested by Blex (2001, pp. 77–78). To increase reliability, two external raters (experts) were engaged to provide advice on error-coding in borderline cases.

For CF-coding, the study used the widely accepted six-part classification by Lyster and Ranta (1997, pp. 46–49), which groups CF into reformulations that provide the target language form and prompts that require the target language form from the L2 learner.

While theory-based classifications were available for OEs and CF, this study worked inductively to develop a taxonomy for NCF after error turns. It follows the categorization of conversational particles and interjections on the listener side at a morphological level as proposed by the German Duden (2022). In addition, the coding of NCF-types also integrates an illocutionary dimension, which focuses on speech intention, communicative function, and action character (Brinker & Sager, 2010, p. 64) (listening, responding, expressing, continuing), as well as the temporal dimension (overlapping/at the end of L2 utterance).

Similar to the CF domain, a six-part coding scheme emerged for NCF (Table 5), one divided into a) listening and b) expressive listener signals from the interlocutor that overlap with the L2 utterance, c) listening, d) responding, or e) expressive listener signals after the L2 utterance has been finished. The sixth category, f) continuing the conversation, is less a listener signal and more a non-corrective listener strategy at the content level, one that includes, e.g., asking questions, interjecting, or thematizing an aspect.

Table 5: Coding Examples¹³ of Non-Corrective Feedback (NCF), part 1

NCF-type	Prototypical Coding Examples
a) listening overlap	learner: Er <u>gehte</u> [ins Kino gestern. He <u>goed</u> [to the cinema yesterday. teacher: mhm-] hm-] okay-] kay-] ah-] ahm-] ja-] ja&ja-] gut-] stimmt-] kla:r] g'nau-]
b) expressive overlap	learner: Er <u>gehte</u> [ins Kino gestern. teacher: aah-] aha-] oh-] o:ha-] ui!] uff!] hui!] wo:w!] hey!] pu:h!] ju-hu!] nanu!] oje.] autsch-] pfff-] ach!] achherrje:] neei:n-] ye:ah-] boa:h] geh!] (laughing)]
c) listening final	learner: Er <u>gehte</u> ins Kino gestern. teacher: mhm. (.) mhm- mhm' hm- okay. okay- kay. a-h: (.) ja.

13 The coding examples given represent examples that have occurred and examples that were expected.

Table 5: Coding Examples of Non-Corrective Feedback (NCF), part 2

<p>d) responsive final</p>	<p>learner: Er gehte ins Kino gestern. teacher: ja: ja&ja:- nein. okay? wirklich? okay' gut- o-ka:y! okay, interessant- m-h:mm' (<i>expressive</i>) na:ja. doch. super, okay' perfekt-, genau: passt' stimmt. echt? ach so:. e:ben. nicht doch. a'bsolut, ja. scho:n. klar. su:per. richtig. alles klar, verstehe natürlich. hoffentlich. vielleicht' na und? allerdings. lei:der.</p>
<p>e) expressive final</p>	<p>learner: Er gehte ins Kino gestern. teacher: (laughing) o-kay- (+) o:::kay::! (laughing) hui! haha! pff! pu:h! uff! oh! ach'! achherrje! eijajei: wo:w! oh la la:! nei:::n! wo:w! ye:ah- boa:h' ju-hu! geh komm! nanu' oje::! au:tsch-! hurra:!</p>
<p>f) topic continuation</p>	<p>learner: Er gehte ins Kino gestern. teacher: Echt? In welches Kino? Really? In which cinema? Gestern war ja perfektes Kino-Wetter! Yesterday was perfect weather for going to the cinema. Ah, ich mag Filme auch sehr gern! Ah, I like movies a lot, too!</p>

The data shows that the same particle (especially 'mhm'/'hm' and 'okay'), depending on prosodic performance (word accent, stress, intonation, loudness), can be used in a listening, expressive or responsive manner and could therefore appear in more than one coding category.

Within the feedback-coding matrix (Table 4), there are two additional categories. If overlapping or successive feedback from both interlocutors occurs, *sequential feedback* is coded, whereas the category *totally ignored* denotes no reaction at all after an L2 error utterance.

To cleanly map error-feedback correlations, this study follows the 1:1 interaction principle: error-type (learner-action) – feedback-type (interlocutor-reaction). However, this method can lead to fuzziness in the coding, so exact and detailed coding rules are necessary, especially when errors ($n > 1$) meet feedback ($n > 1$) in turn-taking. Several errors (uniform errors, multiple errors) in an error utterance are subsumed into one error category; in cases of several reactions (sequential feedback) after an error utterance only the first feedback is coded, while at the same time CF is given greater weighting than NCF. For example, coding according to the 1:1 principle in the error-feedback correlation leads to distortions when CF follows multiple errors, correcting only one error-type and ignoring another. Despite the existence of theoretical coding guidelines for OEs and CF, the presence of borderline cases challenges the consistent categorization and standardization of errors.

5. Findings

5.1. Turn-Taking Pattern in Studio-Based and Desktop Videoconferencing

Different verbal interaction patterns were observed between studio-based and desktop videoconferencing.

Table 6: Prototypical Error Turn-Taking in Studio-Based Videoconferencing

VC_V_T_s/30	
<p>learner: ja: (.) und&rdarum:, hab ich schon- (.) das, Wort verstanden, aber' (.) ich glaube es gibt keine: (.) Wort in: (.) Ja:pan. (.) [So eine:- ja-</p>	} L2 error utterance
<p>teacher 1: Okay.] (.)Aha- Verstehe. Okay.] (.)Ah-, understand.</p>	
<p>teacher 2: Okay. Okay</p>	} sequential feedback
<p>teacher 1: Okay. Interessant. Okay. Interesting.</p>	

Due to the technical conditions in the studio setting (Vienna–Tokyo), the two interlocutors on the Viennese side had the same right to speak in one interaction room. Consequently, more than half (55%) of the sampled error turn-taking involved sequential feedback reactions from the GFL-teachers after error utterances by the Japanese learners. This means that multiple feedback ($n > 1$) – CF and/or NCF – performed by both interlocutors occurred after L2 errors in an overlapping or successive manner (see Table 6).

In contrast, in desktop videoconferencing (Vienna–São Paulo) participants interacted from their own interaction space. Due to the microphone-loud/quiet function, usually only one participant had the right to speak at a time, leading to one interlocutor taking the feedback role. Generally, the same interlocutor who provided input earlier (e.g., questioning) reacted to L2 utterances. Feedback after error turns in desktop occurred as discrete utterances and were less interactive compared to studio (e.g. Table 7).

Table 7: Prototypical Error Turn-Taking in Desktop Videoconferencing

VC_V_SP_d/5	
learner: Äh::, n]ormalerweise:‘ Aktion:filme- [ak'tʃi:ɔ:nfilmə] oder Kommodie [ko'modjə], und&ah auch Triller [tʰʁɪlɐ]. (.) mag ich gern.	} L2 error utterance
teacher1: <u>Super, okay</u>	

Apart from the static error turn-taking, the desktop environment also produced some confusing speaker change structures, mostly caused by the fact that L2 speakers did not switch the microphone back to silent after finishing their contribution. This led to the phenomenon that over the course of multiple turns the learners in Brazil also gave support with listening signals (NCF) to an L2 utterance of a fellow student and consequently acted, in addition to the GFL-teachers in Vienna, as second feedback providing interlocutors.

5.2. Distribution of Oral Errors

In the two sixty-minutes videoconferences, a different total number of error turns was observed among the L2 learners (studio: $N=59$, desktop: $N=76$). However, when OEs were counted individually, almost the same number of errors on the L2 side were found (studio: $N=114$, desktop: $N=119$), which led to a higher error density rate per L2 utterance in studio.¹⁴

14 In all tables and graphs, the numerical values have been rounded to single digits, which may result in minimal rounding errors in individual cases.

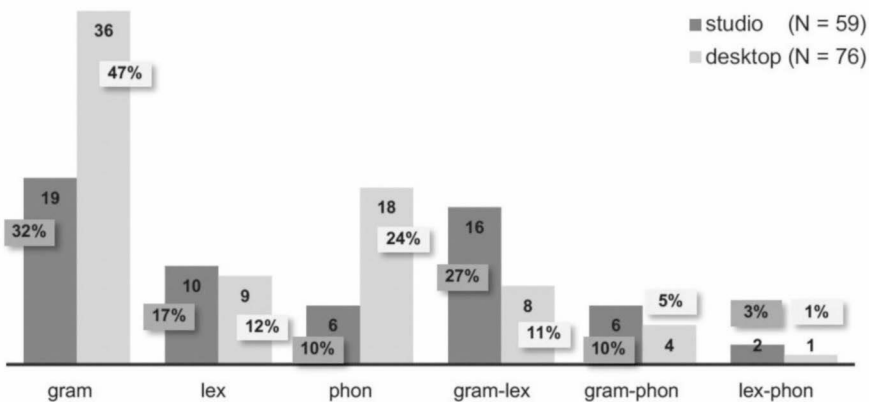
In both samples, single errors were the most frequent (49–59%), with uniform errors occurring less often (10–23%). The frequencies of multiple errors (errors from two different linguistic areas) were not consistent, with multiple errors being most prevalent in studio (41%), while in desktop they accounted for fewer than one in five errors (18%) (Table 8). In studio, almost every second error was a multiple error, which reduced the total number of error turns and resulted in a higher error density, with 1.93 errors per error turn. Conversely, in desktop, only 1.57 errors per error utterance were made by the L2 learners.

Table 8: Number and Percentage of Oral Errors (Style) per Error Utterance

oral error-style	studio (N = 59)	desktop (N = 76)
single errors	29 (= 49%)	45 (= 59%)
uniform errors	6 (= 10%)	17 (= 23%)
multiple errors	24 (= 41%)	14 (= 18%)

In the 6-tiered coding per error turn (Figure 5), the grammatical error was proportionally the most frequent (studio: 32% of 59 error turns, desktop: 47% of 76 error turns).¹⁵ Amongst multiple errors, the error combination grammatical-lexical dominated in both samples (studio: 27%, desktop: 11%), while the other two multiple error categories (gram-phon, lex-phon) occurred only rarely in L2 utterances. Another consistent result across both samples was that lexical errors as single errors appeared at relatively low rates (studio: 17%, desktop: 12%).

Figure 5: Number and Percentage of Oral Errors-Types per L2 Error Utterance



15 In the individual count of all oral errors (studio: N=114, desktop: N=119), the grammatical error reached even higher frequencies in both samples, representing over half of all errors (studio: 57%, desktop: 60%), while lexical errors (studio: 30%, desktop: 17%) and phonetic errors (studio: 13%, desktop: 24%) were less present and were more inconsistent.

Uniform errors were almost exclusively grammatical (studio: 100%, desktop: 76%). They accounted for one third (32–36%) of all grammatical errors, which means that grammatical errors often happened together with other grammatical errors. This phenomenon was not observable for other error-types and therefore stood out as a notable result.

5.3. Feedback-Moves After Error Turns

Only 13–20% of the L2 error utterances were corrected with CF, with around 80% of interlocutor reactions after error turns being non-corrective. From 59 error turns NCF appeared 47 times (studio), and from 76 error turns NCF occurred 60 times (desktop). These NCF frequencies represented a very high proportion in both samples. In contrast, on average fewer than every fifth error utterance was corrected with CF. After almost all L2 error turns an interlocutor reaction (CF, NCF) took place, whereas non-reactions (totally ignored) ranged from 1–7% (Table 9).

Table 9: Number and Percentage of Interlocutor Reactions after L2 Error Utterances

interlocutor reactions	studio (N = 59)	desktop (N = 76)
CF	8 (= 13%)	15 (= 20%)
NCF	47 (= 80%)	60 (= 79%)
totally ignored	4 (= 7%)	1 (= 1%)

Overall, the correction rates of erroneous L2 utterances (13–20%) were strikingly low in both samples. Moreover, the correction rate was calculated per error utterance, and when several errors (uniform, multiple errors) occurred in an error utterance, they were coded together in one error category. So, if the correction rate referred to the total number of errors and not to the error utterances, the rate would have been even lower.

In terms of feedback-giving, almost all CF was carried out by the two prospective GFL-teachers from Austria (studio: N=5, desktop: N=14). Only occasionally was CF offered by the Japanese (N=1) or Brazilian students (N=1) to each other or by the supervisor in the interaction room in Tokyo (N=2).

Table 10: Number and Percentage of Feedback Actions Provided Per Teacher

CF (interlocutors)	studio (N = 5)	desktop (N = 14)
GFL-teacher 1	2 (= 40%)	12 (= 86%)
GFL-teacher 2	3 (= 60%)	2 (= 14%)
NCF (interlocutors)	studio (N = 47)	desktop (N = 60)
GFL-teacher 1	15 (= 32%)	44 (= 73%)
GFL-teacher 2	32 (= 68%)	16 (= 27%)

Both samples (Table 10) clearly showed that, of the two prospective GFL-teachers in Vienna, there was always one dominant and one reserved interlocutor. It is interesting to note that the feedback dominance was valid for providing CF *and* NCF and was not limited to one feedback domain (CF *or* NCF). In studio it is teacher 2 who provided 60% of the CF and 68% of the NCF, whereas in desktop teacher 1 was the more dominant providing 86% of CF and 73% of NCF.

The data analysis of the studio sample showed an unexpected feedback phenomenon when there were two potential interlocutors in one interaction room. Over half of the sampled CF (75%) and NCF (51%) was performed with the participation of *both* interlocutors, either sequentially or partially overlapping. That is, in most cases *both* GFL-teachers in the Viennese studio responded correctively or non-correctively after error turns from their videoconference partners in Japan, not just one.

5.4. Distribution of Corrective Feedback

The CF-distribution (Table 11) showed nearly identical results in studio and desktop, with reformulations (recasts, explicit corrections) accounting for 87.5–90% of the interlocutors' error corrections. Prompts were used rarely (7–12.5%) and only in the form of clarification requests (studio: N=1, desktop: N=1). The remaining CF-types (repetition, metalinguistic feedback, elicitation) did not appear at all in either sample. This means that the interlocutors, when they corrected an error, predominantly provided the target language form and only in exceptional cases demanded, by way of clarification requests, the target language form from the L2 videoconferencing partners.

Table 11: Number and Percentage of CF-Types

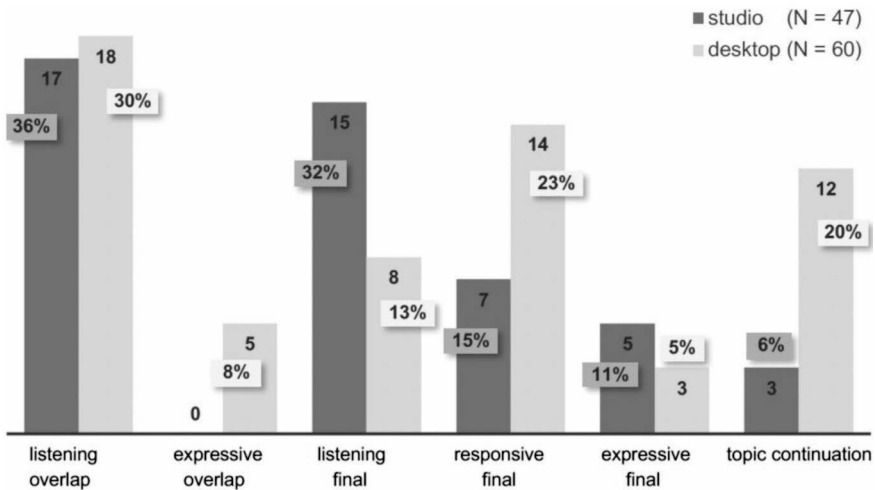
CF-types	studio (N = 8)	desktop (N = 15)
reformulations	7 (= 87.5%)	14 (= 93%)
prompts	1 (= 12.5%)	1 (= 7%)
recast	6 (= 75%)	12 (= 80%)
explicit correction	1 (= 12.5%)	2 (= 13%)
clarification request	1 (= 12.5%)	1 (= 7%)
metalinguistic feedback	—	—
elicitation	—	—
repetition	—	—

Recasts were by far the most frequently used CF-type (75–80%). The prospective GFL-teachers exclusively employed implicit, conversational recasts. There were no explicit, didactic ones in either sample. Due to the low total number of CF collected (studio: N=8, desktop: N=15) and the apparent *reformulations-only policy*, no noteworthy correction routines were identified among the Viennese interlocutors, apart from a consistent preference for the recast.

5.5. Distribution and Realization of Non-Corrective Feedback

The GFL-teachers in Vienna provided NCF after error utterances of the Japanese and Brazilian GFL-learners with the following frequencies (Figure 6):

Figure 6: Number and Percentage of NCF-Types



Compared to CF, the NCF-distribution was more diffuse (Figure 6). Nevertheless, some consistent results emerged from both samples. A total of 47 incidences of NCF in studio and 60 NCF in desktop were collected on the part of the interlocutors after L2 error utterances. Listener-sided conversational particles (receptive particles) with a listening function (listening overlap, listening final) dominated as non-corrective responses and accounted for 68% of all NCF in studio and 43% in desktop. Overall, listening overlaps were the most frequent non-corrective reaction in both samples (studio: 36%, desktop: 30%) after OEs and overlapped as a support signal to the actual L2 error utterance which was not yet finished.

About every third case of NCF was a listening overlap. In contrast, expressive responses to error turns (expressive overlaps, expressive final) were rare (5–11%). The frequency of topic continuation was inconsistent across the two groups (studio: 6%, desktop: 20%), just as in studio rather listening signals (32%) and in desktop rather responsive signals (23%) were used after L2 utterances by the interlocutors and constituted the second most frequent non-corrective reaction after OEs.

Looking at the morphemic realization of the applied NCF (Table 12) independent of the assignment in the 6-fold coding (and not considering prosodic, temporal, or illocutionary aspects), the data showed noteworthy results concerning the use of pure word forms. The receptive particle 'mhm' or 'hm' was the most employed conversational particle on the listeners' side in both samples (studio: N=18, desktop: N=14). The frequencies of the responsive particle 'okay' were also high in both samples (studio: N=7; desktop: N=13), while in studio the responsive particle 'ja' (N=9) occurred second most.

Table 12: Distribution of NCF (Word Form)

NCF-realization	studio (N = 47)	desktop (N = 60)
/mhm/ /hm/	18	/mhm/ 14
/ja/	9	/okay/ 13
/okay/	7	/mhm okay/ 3
/okay mhm/	1	(laughing) 3
/okay aha verstehe/	1	/ja/ 2
/aha/	1	/genau ja/ 2
/ah/	1	/okay mhm okay/ 2
/ah aha/	1	/ah okay/ 1
/ah okay okay/	1	/ja mhm okay/ 1
/ah okay mhm cool/	1	/okay okay/ 1
/wow okay/	1	/okay wirklich/ 1
/ja ja/	1	/okay also/ 1
/verstehe/	1	/okay aber/ 1
/achso/	1	/ja aber/ 1
/gesundheit/	1	/super naja/ 1
/und/	1	/super okay/ 1
topic continuation	3	/perfekt/ 1
		/ah/ 1
		/aha/ 1
		/aha genau genau/ 1
		/genau/ 1
		/genau genau ja/ 1
		/mhm genau mhm/ 1
		/absolut ja/ 1
		/achso/ 1
		/versteh okay alles klar okay okay versteh/ 1
		topic continuation 12

If the frequencies of the particles ‘mhm’/‘hm’ and ‘okay’ are grouped together (Table 13), we obtain noteworthy values. These two particles together accounted for 46% of all feedback actions (CF/NCF) in studio and for 36% in desktop after or during L2 error utterances. This means that in studio almost every second reaction of the Viennese interlocutors after an L2 error turn was either ‘mhm’/‘hm’ or ‘okay’, while in desktop it was more than every third. These high values clearly show what a negligible role CF plays in the examined SLA context.

Table 13: Number and Percentage of Particles ‘mhm’/‘hm’ and ‘okay’ of All Feedback Actions

FB-moves (total)	studio (N = 55)	desktop (N = 75)
mhm/hm	18 (= 33%)	14 (= 19%)
okay	7 (= 13%)	13 (= 17%)
	25 (= 46%)	27 (= 36%)

An interesting result of the study is that NCF delivery was characterized by a variety of particle combinations (doubling, interchanging, different order, etc.), with the data showing a certain linguistic systematics in the variation of particle use (Table 14) by the interlocutors.

Table 14: Prototypical Examples of Particle Combinations

mhm	okay	mhm okay	okay mhm	okay mhm okay	mhm okay okay
genau	genau ja	ja genau	genau genau	aha genau genau	mhm genau mhm
ah	aha	ah aha	ah okay	ah okay okay	okay aha verstehe

Among these particle combinations, the frequency of the responsive particle 'okay' stood out particularly (Table 15). Of all NCF collected in both samples (N=107), variations that included 'okay' occurred in 38 cases and accounted for 36%.

Table 15: Distribution of Listener Signals with the Particle 'okay'

/okay/- variations	NCF total* (N = 107)
/okay/	20
/mhm okay/	3
/okay mhm okay/	2
/okay mhm/	1
/ja mhm okay/	1
/okay okay/	1
/okay aha verstehe/	1
/ah okay/	1
/ah okay okay/	1
/ah okay mhm cool/	1
/wow okay/	1
/super okay/	1
/okay wirklich/	1
/okay also/	1
/okay aber/	1
/versteh alles klar okay okay versteh/	1
	38/107 = 35.5% (of all NCF)

*total = studio und desktop (NCF from both samples)

In CF distribution, no obvious correction routines were found, except for the preference for recasts, but the data provided unexpectedly strong evidence that individual NCF routines were present amongst the prospective GFL-teachers (Table 16).

Table 16: Number and Percentage of NCF-Types (word form) Used Most per Interlocutor

NCF	studio (N = 47)	Ratio value to the total number of occurrences of the respective word form
teacher 1	n = 15	
mhm/hm	6 (= 40%)	
ah/aha	3 (= 20%)	3/3 = 100%
/okay/-variations	3 (= 20%)	3/12 = 25%
/verstehe/-variations	2 (= 14%)	2/2 = 100%
...		
teacher 2	n = 32	
mhm/hm	11 (= 34%)	11/18 = 61%
ja	9 (= 28%)	9/9 = 100%
/okay/-variations	8 (= 25%)	8/12 = 67%
...		
NCF	desktop (N = 60)	
teacher 1	n = 44	
okay	12 (= 27%)	12/13 = 92%
/okay/-variations	12 (= 27%)	12/12 = 100%
/genau/-variations	6 (= 14%)	6/6 = 100%
...		
teacher 2	n = 16	
mhm/hm	8 (= 50%)	8/14 = 57%
(laughing)	3 (= 19%)	3/3 = 100%

It appears that certain particles were used exclusively by one interlocutor, and not at all by the others. In studio teacher 1 used three from three of the occurring 'ah'/'aha' (100%) or two from two 'verstehe'-variations (100%), while teacher 2 delivered nine out of nine 'okay'-variations (100%) after L2 error utterances. In desktop, a similar picture emerged with teacher 1 being responsible for 12 from 13 occurring 'okay' (92%) and six from six 'genau'-variations (100%). Laughter as a non-corrective response after errors occurred three times in desktop and was performed all three times (100%) by teacher 2.

5.6. Correlations between Errors and Feedback

The data showed that CF was used most (67–75%) in both samples after single errors and less often (13–27%) after L2 utterances with more than one error (uniform/multiple errors).

If we look closely at which errors, according to their linguistic category (Table 17), were corrected most and least with CF, we see consistent results across both samples. Lexical errors (30–33%) and grammatical-phonetic errors (16–50%) were corrected relatively often, while lexical-phonetic errors were consistently left uncorrected. For all other error categories, the correction rates were too varied and inconsistent to be of research value.

Table 17: Corrected Oral Errors by Linguistic Category

Corrected errors in %	studio	desktop
1.	lex (30%)	1. gram-phon (50%)
2.	phon (17%)	2. lex (33%)
	gram-phon (17%)	3. gram-lex (25%)
3.	gram (11%)	4. phon (17%)
4.	gram-lex (6%)	5. gram (14%)
5.	lex-phon (0%)	6. lex-phon (0%)

If the correction percentages of the individual error-types are compared with the actual error frequencies, the following points can be made:

- a) Lexical errors, which are the third most frequent of all OEs (12–17%), are corrected relatively often (30–33%).
- b) The most frequently occurring grammatical errors (32–47%) are corrected relatively infrequently (11–14%).

Consequently, there is a discrepancy between how often errors occur and how often they are corrected. In other words, the data shows a tendency to correct the least occurring errors the most and most occurring errors the least.

In the OE-CF correlation it is further striking that, within all reformulations (recasts, explicit corrections) of grammatical-lexical errors, 100% of the lexical errors were addressed while 100% of grammatical errors were left unaddressed. In contrast, recasts used after grammatical-phonetical errors always covered both error-types and grammatical-phonetical errors correlated with ‘double-recasts’, so to speak. This result was remarkable in that both phenomena were consistent in both samples and grammatical-lexical and grammatical-phonetical error-types were to 100% corrected only in this way.

Due to the small total number of CF provided in both samples, it is unclear how meaningful the correlations between CF and error-type are. Moreover, given the low number of CF and the basic recast dominance in the data, the present study cannot confirm the findings of other studies (chapter 3.1) that phonetic errors are preferentially answered with recasts and lexical errors are more likely to be answered with prompts.

One third of all listening overlaps (33%) occurred during L2 utterances with phonetic errors, while 25–66% occurred together with grammatical-phonetic error turns. From this, one can infer a correlation between overlapping listener signals and phonetic errors. A more definite result was that expressive NCF (expressive overlap, expressive final) was used by the interlocutors exclusively after single errors (100%), with expressive listening signals after uniform or multiple errors being absent. The NCF-types listening final and responsive final tended to be used after L2 utterances with grammatical and lexical errors, respectively. Over half of all topic continuations (58–67%) occurred after grammatical errors.

Similar to the CF domain, and due in part to the recast dominance, statements on correlations for the NCF domain were also complicated by the dominance of the NCF-type listening-overlap after all error-types.

6. Discussion

6.1. Responses to Research Questions

The purpose of the study was to provide a detailed overview of the distribution of OEs and CF/NCF in NS-NNS-interactions within oral SCMC and to advance research into *non-corrective* feedback. The data analysis provided answers to the following research questions:

(1) How does the videoconferencing format influence turn-taking structures after L2 error utterances?

The different technical conditions between videoconference formats produced different *right-to-speak* conditions (studio: equal, parallel right-to-speak of both interlocutors in one interaction room; desktop: the microphone-loud-quiet function created an individual right-to-speak for a single interlocutor). While in desktop usually only one interlocutor in Vienna reacted to an L2 error utterance on the Brazilian learners' side (static turn-taking), the data from a studio setting showed more interactive turn-taking, with 55% sequential feedback after error turns in which both interlocutors in Vienna reacted simultaneously or successively to erroneous speech utterances of the Japanese learners (dynamic turn-taking).

(2) What is the distribution of oral errors in L2 utterances?

Single errors were most frequent in both samples (49–59%). Multiple errors occurred more frequently in studio (51%) than in desktop (41%). This caused a comparatively higher error density per error turn in studio, which was also due to a lower language level of the Japanese L2 learners. The grammatical error was the most frequent error-type (32–47%), while lexical errors (12–17%) and phonetic errors (10–24%) appeared less often. Among multiple errors, the error combination grammatical-lexical was the most common (11–27%), while grammatical-phonetical and lexical-phonetical errors were less evident. In respect of uniform errors, grammatical errors (77–100%) stood out, with one third of all grammatical errors being uniform errors. This was an unexpected secondary finding of this study. The data provided strong evidence that grammatical errors often occur together with one or more errors of the same linguistic categories in L2 utterances. This phenomenon was not observable for other error categories.

Other F2F studies have concluded, like this one, that grammatical errors are the most frequent error-type (Lyster, 1998; Mori, 2002; Morris, 2002), while an oral SCMC study by Saito and Akiyama (2017) and a F2F study by Milla and García Mayo (2021) cited phonetic errors as the most frequent. Due to the lack of studies on error frequencies in SLA contexts, it remains unclear whether grammatical errors are always the most frequently occurring error-type. Nevertheless, error distribution analyses point to this being the case. It seems that contextual factors, such as the learning environment (F2F, SCMC),

the interaction context (NS-NNS, NNS-NNS), the specific target language (L2) or the L1 of the L2 learners, do not affect error distribution. Further research is needed to establish if there is a correlation between learner-external or learner-internal factors and OE-frequencies.

(3) Which reactions of interlocutors appear after L2 error utterances? What is the distribution of corrective feedback and non-corrective feedback?

Interlocutors provided either a corrective or non-corrective response after nearly all error utterances (93–99%). Most feedback after errors were non-corrective listener-side responses (80–85%). Only up to one-fifth of all error turns (13–20%) were corrected by interlocutors with CF. Videoconferencing, as a low-correction environment, appears typical of language learning via CMC (Zourou, 2009, pp. 13–14).

Despite a lack of CF frequency studies, the few existing distribution studies in oral SCMC observed similar low correction rates (13–23%) in NS-NNS-peer-dyads (Saito & Akiyama, 2017, pp. 59–60) or found only 22 instances of CF in 7.5h group-to-group video-conference recordings (Hoshii & Schumacher, 2012, pp. 64–65).

In F2F, significantly more CF occurs, and an average correction rate of 55% for OEs was identified in prior research.¹⁶ The data provided clear evidence that a low use of CF is common in distance language learning via videoconferencing, while in classroom-based SLA there is a significantly higher rate of CF.

This study cannot categorically assert an interrelation between the specific technical videoconferencing setting (studio, desktop) and how often errors are corrected, because in both samples the correction rates were similarly low.

In both videoconferencing settings, the interlocutors almost exclusively applied reformulations (86–93%) as CF. 7 out of 8 instances in studio and 14 out of 15 CF in desktop were reformulations. The recast was the most used CF-type (75–80%), with explicit corrections accounting for about 13% of all CF. Prompting was utilized only once in each videoconference and only as a clarification request (7–13%). The CF-types metalinguistic feedback, elicitation and repetition did not appear in the data material. It is noteworthy that the results for CF distributions from the few existing oral SCMC studies (e.g., Akiyama, 2017, p. 67; Debras et al., 2015, p. 18; Hoshii & Schumacher, 2012, pp. 65–66) correspond exactly to the results of this study. They observed the same ranking in CF frequencies and confirm the limited use of the three CF-types. As in this study, only recasts, explicit corrections and clarification requests were used in videoconference-based SLA peer-settings, making the identified CF distribution of this study representative of such interaction contexts.

In studies examining similar interaction settings, reformulation and recast preferences have previously been interpreted to mean that interactants value these CF-types as appropriate and time-efficient feedback in videoconferencing, that participants have little experience using CF and consequently focus on the flow of communication, or that there is uncertainty about their appropriate role (tutor-peer) or fear of appearing too dominant through prompting (Akiyama, 2017; Cavalari et al., 2022; Debras et al., 2015,

16 To generate this value, a meta-analysis was carried out based on 13 selected F2F-studies in various language learning contexts (Lankl, 2023, pp. 151–152).

Freschi & Cavalari, 2020; Hoshii & Schumacher, 2012; Zourou, 2009). Applied to this study, the lack of teaching experience of the prospective GFL-teachers appeared to have a limiting effect on the range of CF-types being used, with recasts being favored over a fuller range of correction strategies. Furthermore, contextual factors, such as a lack of clarity about the correct interaction level of the videoconferencing participants (tutor-learner or peer-peer), the technical conditions of the computer-mediated language learning environment, and the limited experience of the interlocutors with CF, jointly produced a lack of variation in CF behavior.

It remains unclear whether the CF-distribution observed here or in other studies is specific to distance language learning via videoconferencing and the influence of external factors such as the learning environment, or whether intrapersonal factors related to the interaction partners are determinative of CF distribution. However, the connection between a low overall correction rate of oral errors (compared to F2F) and the videoconferencing environment was evident from an empirical standpoint. The NCF-distribution after error utterances was more complex than in CF. Listening overlap was the most frequent NCF-type (30–37%) utilized by prospective GFL-teachers after or during error turns in both samples. Thus, particles were most frequent in receptive function and overlapping with L2 utterances. NCF delivered after the completion of the L2 utterance and expressing listening or responding (listening final, responsive final) ranked second quantitatively (13–32%), whereas expressive listening signals (expressive overlap, expressive final) were used less often (5–11%). The different frequencies in the NCF-type topic continuation (studio: 6%, desktop: 20%) indicate a different moderation style of the NS-interlocutors. It is outside the scope of this study to draw conclusions about the distribution results in the NCF area, since the participants were not questioned about this with retrospective interviews or stimulated recalls in the context of a mixed-methods design.

(4) How are non-corrective feedback-types realized?

Regardless of the temporal dimension, 43–68% of NCF performed a listening function and 15–23% a responsive function. This fact was also reflected in the frequencies of the listener-side conversational particles used, as in sampled NCF (studio: N=47, desktop: N=60) the receptive particle 'mhm'/'hm' was used most by the NS interlocutors after L2 error utterances (studio: N=18, desktop: N=14). The responsive particles 'okay' (studio: N=7, desktop: N=13) and 'ja' (studio: N=9) also appeared frequently as non-corrective responses after OEs. High frequencies of the reception particle 'mhm'/'hm' and response particle 'ja' are confirmed by previous research (chapter 3.1).

In total, 39–46% of all NCF were executed with the use of the particles 'mhm'/'hm' or 'okay', which is a noteworthy percentage. The repeated use of the same particle illustrated a one-sided, monotonous, non-corrective reaction pattern by the interlocutors after errors and highlighted a clear reluctance to correct errors.

The present study was able to observe for the NCF-domain numerous systematic forms of combination (doublings, sequence permutations, etc.), which are typical of particles. The range of variation of particles was especially evident around the responsive particle 'okay'. 36% of all NCF from both samples were particle combinations in which 'okay' was included (e.g., 'mhm okay', 'aha okay', 'okay mhm okay', 'okay okay', 'ja mhm

okay', etc.). The data indicated further that the particles 'mhm'/'hm' or 'okay' could be phonetically performed in different ways and fulfil different conversational functions (e.g., listening, responsive or expressive character), depending on prosodic variation. For the particle 'hm', Ehlich (1979) pointed out this aspect several decades ago. For a more extensive contextualization of this phenomenon, sociolinguistic studies working with interview data of speakers may offer a possibility to investigate the functional-pragmatic use of particles in more depth.

(5) What correlations exist between oral errors and (non-)corrective feedback?

More CF (67–75%) was delivered after single errors than after L2 utterances that contained more than one error (uniform errors, multiple errors). Debras et al. (2015, p. 18) found similar results and observed an increased use of CF after single errors and less after multiple errors in oral SCMC. In the NCF domain, the interlocutors delivered relatively balanced auditory signals, such that no obvious correlation between NCF and error-type was apparent. Whether the single errors-CF correlation was due to the working memory of interlocutors being overloaded during responses after multiple errors remains a subject of conjecture.

Probably one of the most interesting questions of this study is which linguistic error-types the interlocutors tended to correct. Here the data showed consistent and revealing results regarding the correlation between error-types and CF. The more low-occurring lexical errors were corrected relatively often with CF (30–33%), and one in three lexical errors was followed by CF. Conversely, the most frequently occurring grammatical errors were rarely corrected by the interlocutors (11–14%). These findings are consistent with observations from F2F studies (e.g., Lyster, 1998; Morris, 2002; Saito & Akiyama, 2017) and confirm Chaudron's (1988, pp. 140–141) claim from the 1980s that the most frequently occurring errors are corrected the least and the least frequently occurring errors are corrected the most.¹⁷

That CF after grammatical-lexical errors in both samples addressed only the lexical error and left the grammatical error uncorrected, while recasts after grammatical-phonetic errors always addressed both error categories, was a noteworthy finding of this study. However, due to the low incidence of CF after multiple errors, the significance of these results is limited.

The correlations between OE-types and NCF were less clear than in the CF domain. The data only indicated correlation tendencies, e.g., that listening overlaps correlated with phonetic errors and topic continuation correlated with grammatical errors. However, one aspect that clearly emerged from the data in both samples was that expressive

17 While numerous CF distributional studies have found CF to occur mostly after grammatical errors (e.g., Blex, 2001; Brown, 2016; Ellis et al., 2001; Havranek, 2002; Kleppin & Königs, 1991; Lochtmann, 2002; Mackey et al., 2000; Nabei & Swain, 2002) or lexical errors (e.g., Debras et al., 2015; Ziegler & Mackey, 2017), they have not investigated error frequencies or correction proportions. Therefore, they cannot provide information about how frequently a particular error-type is proportionately corrected, which must be considered critically in terms of their explanatory power.

listening signals (expressive overlap, expressive final) occurred exclusively after single errors and not after multiple errors, which implies that the correlation between expressive listening signals and single errors is relatively stable.

(6) What feedback routines do the interlocutors employ?

The distribution analysis of feedback also made the feedback activity of the interlocutors visible and showed that one interlocutor of the two prospective GFL-teachers in Vienna always acted as the dominant feedback provider. This finding was consistent across both samples and applied to the provision of CF and NCF. In studio, this interlocutor provided 60% of CF and 68% of NCF, while in desktop they provided 86% of CF and 73% NCF. The second interlocutor in studio and desktop was significantly more reluctant to respond to erroneous learner utterances.

The data showed no apparent correction routines apart from a general recast preference among the interlocutors. In contrast, the NCF domain revealed very strong routines in particle application. The data analysis demonstrated that some interlocutors exclusively used very specific particles (e.g. 'aha', 'ja', 'genau', 'okay') while others did not use them at all. Such results were unexpected and can be considered as an additional achievement of this study.

6.2. Pedagogical Implications

When it comes to the transferability of the results to video-based SLA contexts and the handling of oral errors as well as the application of feedback, the main findings of this study can be described with the keywords *reflection*, *awareness*, and *variation*. For (future) language teachers, the results of this study provide:

- a) an insight into the structure of speaker changes,
- b) an insight into the type, nature and possible combinations of oral errors and feedback,
- c) an insight into the average frequency of occurrences of oral error-types and feedback-types and their correlative relationships.

The following pedagogical recommendations for (prospective) language teachers interacting with L2 learners in videoconferencing can be made:

- 'Courage to correct' even in SCMC; open discourse with L2 learners about dealing with errors and focus on form;
- Checking error foci (feedback on different error-types, not neglecting one error level: eyes on grammatical errors);
- Awareness of corrective behavior in the case of multiple errors in learner utterances;
- Reflecting on correction routines, applying different CF-types, using the whole CF-spectrum, e.g., alternating CF-types, using not only reformulating but also eliciting CF-strategies;

- Checking one's own signalling routines as listener: use of different particles/interjections; avoidance of monotonous non-corrective response patterns in communicative interactions with L2 learners;
- Understanding the different functions of listener signals in conversational situations (focused, purposeful use of certain listener signals adapted to the target group: e.g., expressive listener signals promote learners' motivation to speak; language learners at a beginner level or younger learners);
- Awareness of timing of own feedback (overlapping, interrupting, after L2 error utterances), critical questioning of frequent use of overlapping listener signals as it can disturb the interaction flow of L2 learners or cause acoustic problems in videoconferencing;
- Perceiving each other's feedback (in the case of a second interlocutor);
- Awareness of any dominant interlocutor role (in the case of two interlocutors): Self-perception and perception of others.

6.3. Limitations of the Study

Firstly, it is important to acknowledge that the cognitivist approach utilized in this research project, which was based on a 1:1 understanding of communicative interaction in terms of action (error) and reaction (feedback), has distinct limitations. In particular, the coding process is problematic, as it produces many borderline cases and definitional fuzziness that could only be resolved via the use of highly interpretive coding decisions. Necessarily, it can be unhelpful to represent linguistic interaction as a 1:1 action-response pattern when communication around erroneous L2 utterances is often dynamic, complex, unpredictable, and manifold. The data showed that error and feedback was rarely in a 1:1 relation to each other and that multiple errors in L2 utterances or multiple incidences of feedback from several interlocutors seemed to be more the rule rather than the exception. This reality could only be accommodated in the coding by grouping errors (uniform errors, multiple errors) or sampling the first occurring feedback only, which distorted the actual error and feedback frequencies.

Furthermore, the causal relationship between particles, such as 'mhm' or 'hm' or 'okay', and oral errors and whether they should rightly be classified as *non-corrective feedback* is still an unsettled question. After all, particles are basically omnipresent in any communication regardless of errors. Thus, it is legitimate to question the extent to which conversational particles should be defined as NCF and considered as a specific reaction to OEs.

Further, the application of a transcription system originating from the social sciences for a video interaction analysis with linguistic or conversation-analytic interest was not unproblematic. Time-intensive transcription processes turned out to be disadvantageous, with autonomous transcription decisions producing measurement errors and reducing the comparability of results. Use of a computer-assisted transcription method would likely have yielded more accuracy and greater standardization in data preparation and analysis, which would have increased the validity and reliability of the results.

Regarding the selected sample, it is critical to consider that on the one hand, the L2 learners in Tokyo and São Paulo had different L1s (Japanese, Brazilian). In addition, the German language level of the L2 learners varied, which limited the validity and comparability of the error frequencies. The study reached its limits here and the question remains to what extent contrastive linguistics should have been included.

Even though the study expanded the focus from CF to NCF, included prosodic criteria in the data analysis, and ventured an inductive approach in the NCF domain, multimodal feedback or self-regulatory learner corrections were excluded from consideration. Nevertheless, the data showed some places where negotiation of meaning was dynamic and interactive across repeated turn-taking. A holistic, interpretive approach may have been more appropriate here than a largely deductive-quantifying sampling that captured only the interlocutors' initial reaction after an erroneous L2 utterance.

The study further reached its limits when it comes to explanations of the observed error and the feedback frequencies. To address this shortcoming, it might have been helpful to use a mixed-methods design, one that included retrospective interviews or stimulated recalls with the videoconference participants. Consequently, the study presents scores for error and feedback distributions but cannot provide a contextualization of the phenomena on the part of the participants. Also, the fact that there were no meaningful differences in error and feedback distribution in the two videoconferencing formats calls into question the selection of the data corpus and the importance placed on the technical differences between the two computer-mediated settings within the study.

7. Conclusion

The purpose of the study was to provide micro-level insights into error and feedback occurrences for the specific language learning context of group-to-group videoconferencing (NS-NNS). The results from both studio-based and desktop videoconferencing were consistent, resulting in no noticeable correlations of error or feedback frequencies that can be attributed to one videoconferencing format.

In terms of the future applications of this study, attention can be drawn to the fact that videoconference-based SLA contexts should be given a prime place in future CF-research, and that a shift in focus from CF to the NCF domain may provide deeper insights in L2 interaction research.

For future CF-research, approaches that fully consider findings from distribution and correlation studies should be conducted, e.g., those that ask, 'which errors and feedback occur, how often, and what is the relationship between the two?'. In addition, more efficacy studies which focus on the question 'what works best for which error?' are needed. The results of both are likely to be relevant and necessary for language teachers and transferable to their everyday work.

If one wants to derive pedagogical recommendations from the study, it appears important to promote reflection, awareness, and variation of the use (non-)corrective feedback among language teachers in dealing with the oral errors of L2 learners. Teachers can review their handling of errors in videoconferencing, compare it to F2F and become aware of their routines or certain error foci. For L2 learners, in turn, awareness of the

nature and frequency of their own errors in the target language can support their meta-linguistic awareness.

The results of this paper highlight the need for qualitative interview research and for teachers themselves to have an open discourse with L2 learners regarding attitudes, wishes or fears that exist on both sides (teacher and learner) about oral error correction, especially in the interactive context of videoconferencing. Moreover, it needs to be determined which (non-)corrective feedback strategies are preferred over others.

Finally, it remains to be seen what emphasis should be placed on the correctness of linguistic form and oral error correction in distance language learning between peers, given that incorrect form does not necessarily result in incomprehensibility. It could be argued that as long as meaning is understood intersubjectively between communication partners, corrective focus on form is of only secondary importance. Ultimately the question of conceptualizing and defining correctness arises, just as the question of weighting accuracy relative to complexity and fluency (Michel, 2017, pp. 52–56) in L2 speech remains a legitimate one.

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Section IV:

Social Media and Self-Regulated Learning

Learner Engagement through Feedback Processes on – and Inspired by – Social Media

Jennifer Schluer

Abstract *This chapter explores the pedagogical potential of popular social media platforms, specifically Instagram, TikTok, X (Twitter), and Facebook, with a focus on educational feedback exchanges. In the contemporary digital landscape, these platforms have become ubiquitous as everyday companions, but their utilization in teaching contexts is disputed. The chapter therefore first reviews the affordances and challenges associated with an educational use of social media in the prior literature. Subsequently, it assesses the suitability of social media features for feedback exchanges and provides recommendations for their utilization in educational settings. Overall, it appears that social media have the potential to innovate and facilitate feedback processes, but research on their effectiveness is still limited. Notably, the various video features of Instagram and TikTok create novel and convenient opportunities for multimodal feedback that are not (yet) included in many video editors. Also, the availability of multifaceted ways of interaction can empower and engage students actively in learning through content creation, feedback, and collaboration. To a certain extent, this can likewise be accomplished through fake messengers or other alternative applications. By shedding light on these untapped potentials, the paper contributes to the ongoing discourse on innovative pedagogical approaches in the digital age.*

Keywords *digital feedback; social media; TikTok; Instagram; learner engagement; multimodal feedback*

1. Introduction

Social media have become an integral part of the lives of many, especially young, people. As an everyday companion, they entertain through amusing videos and enable social interaction with other, often unknown, people and communities. Moreover, the utilization of social media for educational purposes has garnered attention in the past years, notably since the Covid-19 pandemic (Papademetriou et al., 2022, p. 1). Nonetheless, their pedagogical affordances have not been thoroughly explored so far, especially not with regard to educational feedback exchanges. In particular, the potentials of popular social

media apps, such as Instagram and TikTok, deserve further exploration and investigation (Schluer, 2022, p. 244; cf. Aloraini & Cardoso, 2022, p. 1710). At the time of writing the 2022 book, the majority of published research on social media dealt with Facebook, YouTube and Twitter (now renamed X), whereas more recent tools had scarcely been examined (Schluer, 2022). As Barrot (2021) remarked, it took on average eight years after the initial release of an app until research about it was published (p. 20). In his review, Barrot (2021) covered 17 social media platforms and found that

“[...] high-profile platforms such as Facebook, Skype, WhatsApp, and Twitter remain to attract the greatest attention from language learning scholars. This phenomenon was attributed to their multiple and flexible communication affordances, wide geographical distribution, and large number of active users.” (Barrot, 2021, p. 24)

Meanwhile, additional social media apps, notably Instagram and TikTok, have rapidly gained in popularity, but their educational potentials await further investigation (cf. Perez et al., 2023, pp. 19, 22). This chapter will therefore review the affordances offered by social media for feedback purposes, in particular Instagram, TikTok, Twitter (X) and Facebook. It will also reflect on their limitations and offer ideas for implementation in the classroom. The chapter will close with a discussion of future research needs and dynamic developments.

2. Definition and Examples/ Tools

Social media are online spaces where individuals create profiles to connect with larger (oftentimes global) communities based on shared interests (cf. the review by Camas Garrido et al., 2021, p. 137; Papademetriou et al., 2022, p. 7). They facilitate the exchange of user-generated content and serve “as a source of social interaction, collaboration, and creative expression” (Al-Qaysi et al., 2020, p. 2086; cf. Camas Garrido et al., 2021, pp. 137–138; Sengupta & Vaish, 2023, p. 2). Users can actively participate, comment, share, (co-)create and modify contents, while communicating and engaging with others in numerous ways within and across these platforms (Sengupta & Vaish, 2023, p. 2; cf. the reviews by Barrot, 2021, p. 3, and Papademetriou et al., 2022, p. 1). Accordingly, they have alternatively been termed “participatory media tools” (Cuevas & Kohle, 2010, p. 3597), “social networking tool[s]” (Misnawati et al., 2022, p. 210) or “Social Network Sites (SNSs)” (Camas Garrido et al., 2021, p. 137; cf. Perez et al., 2023, p. 2). Apps have been developed for most of them to ease an anytime-anywhere access on mobile devices.

As Papademetriou et al. (2022) acknowledged, “[d]efining social media is a challenging task” (p. 1) as they are continuously changing. They have been categorized in broader or narrower ways, either including or excluding blogs and wikis and similar applications. Papademetriou et al. (2022) adopt a broad definition and cite “content communities” (e.g. YouTube), blogs and “collaborative projects” (e.g. Wikipedia) alongside “social networking sites”, such as LinkedIn, ResearchGate, Facebook, Twitter (X) and Instagram, as well as “social messaging applications”, for instance chat apps like WhatsApp and Telegram (p. 2). While the scope of functions of many applications becomes more comprehensive

and more similar over time, it is understandable that clear-cut distinctions are hard to make. Often, social media combine several functions, such as various types of commenting, file sharing, video creation and voice messaging as well as many others (cf. Manca, 2020, cited by Barrot, 2021, p. 3; Vuori & Okkonen, 2012, quoted by Sengupta & Vaish, 2023, p. 2). **Social media feedback** means using these social networking tools (e.g. Facebook, TikTok, X, Instagram, Snapchat, etc.) to exchange feedback in a variety of modes and in different directions, including teacher feedback, peer feedback, student feedback, or combinations of them.

Social media appear to be particularly fitting for formative assessment due to their manifold interaction features. So far, they have mostly been adopted in higher education and professional education settings, but could also be used with students from other levels when the required permissions and informed consent have been granted. For example, in Arulchelvan et al. (2019), social media was used as a learning tool for primary school participants aged between 10 and 11.

Since “[t]he educational content shared on social media can be any form of text, audio or video, etc.” (Sengupta & Vaish, 2023, p. 2), social media can be utilized for all types of assignments as individual and group work, including but not limited to written tasks, video or audio production, and creative assignments (e.g. designs, illustration, crafting, materials development). Accordingly, social media feedback can be implemented in a variety of disciplines, such as language learning (Tran & Pham, 2023), teacher education (Suana et al., 2019; Lin et al., 2013), accounting (Liu, 2018), engineering (Evans, 2013), nursing (Almutairi et al., 2022) and many more. The learning environment could be an online or hybrid class or a complement to face-to-face sessions as part of blended learning.

Typically, a mobile phone and a reliable internet connection are needed to utilize social media. However, some applications can also be opened on a tablet, laptop or desktop computer. Wi-Fi access should be preferred to avoid overusing students’ and teachers’ mobile data volume on personal devices.

The choice of appropriate apps should be made on pedagogical considerations, notably the learning goal and task (see also the feedback taxonomy chapter 4 by Schluer in this volume). The popularity of different apps is changing over time, with some groups or generations preferring certain tools or only using them for clearly delineated purposes due to their scope of functions or audience. Facebook, for instance, used to be a very popular platform, also among the younger generation, before Instagram and TikTok took over this position. While different apps often have unique features, the range of functions has grown constantly, making some of the applications and platforms increasingly similar in scope. A brief characterization of the main purposes will be sketched here, before specific feedback functions will be presented later on in more detail (section 5).

Facebook is a social networking tool that enables individuals and groups to communicate with each other, to form communities and disseminate content online. For this, users create a personal profile with professional and/ or personal information, through which they can share links and multimedia files as well as their own content. Approved friends can interact with the shared content through public or private messages and a chat feature (Queen Mary University of London, 2020).

Instagram is a popular social media platform for sharing photos and videos with others (Lynch, 2018). Commenting is possible in various ways, e.g. through (re-)posts, reels, written comments, direct messages (written, audio or video) and stories.

TikTok is a social media app that allows users to create and edit short videos ranging from three to 15 seconds, or longer if uploaded from another source (currently up to 10 minutes) (Edwards, 2022). Users have the flexibility to create and comment on various types of content through comments, stitches, voiceovers etc.

Twitter (X) is a microblogging platform where users can publish their ideas and opinions in real-time through short messages called “tweets”. These tweets are limited to 280 characters (or more if paying a subscription to X Premium). Twitter (X) also provides “features such as hashtags, mentions, and replies”, which allow people to network and engage in dialogues with other Twitter users (Malik et al., 2019, p. 2).

In the following sections, some advantages and limitations of using social media for feedback purposes will be discussed, before several suggestions for practical implementation will be presented in section 5.

3. Affordances

Through social media, learner engagement can be enhanced in a variety of ways, including

- motivation and attractiveness through a contemporary interaction format,
- flexible availability in time and space,
- promotion of communicative and collaborative competencies during authentic interaction between learners within and especially beyond the classroom,
- participation and interaction through a diversity of communication channels and modes,
- increased attention through short feedback sequences and novel feedback options.

These and other points will be discussed in the subsequent paragraphs.

3.1. Beyond the Traditional Classroom

Social media can promote communication and cooperation within and beyond the classroom, which might contribute to more authentic interactions and more open, collaborative education. This advantage has been highlighted in much published literature about social media (Ekahitanond, 2018, p. 691; Forbes, 2017, p. 176; Niu, 2019, p. 1396; Papademetriou et al., 2022, p. 1). It may not only foster peer-to-peer and learner-to-teacher interactions (Ukwishaka & Aghaee, 2002, cited by Papademetriou et al., 2022, p. 18), but crucially also the establishment of communities of practice in personal or professional networks (Forbes, 2017, p. 176; Malik et al., 2019, p. 11; Mnkandla & Minnaar, 2017, p. 240). As such, social media can help to reach farther than the classroom and institution to communicate with a potentially global audience.

Opportunities for interaction and feedback are thus enhanced, for example to obtain expert advice from specialists beyond the limited face-to-face audience (Aloraini & Cardoso, 2022, p. 1724, regarding Twitter; cf. Couros & Jarrett, 2012, cited by Forbes, 2017, p. 176; Greenhow et al., 2009, p. 249). For instance, in artistic disciplines, such as Graphic Design, students can gain valuable feedback on their work-in-progress from a wide community and thus perceive a variety of interpretations that may or may not coincide with their own intentions (Ruiz-Ruiz & Izaguirre, 2022, p. 3230). These opportunities for feedback and networking can also be helpful for students' professional future (cf. the review by Malik et al., 2019, p. 11). Moreover, in language learning contexts, students may profit from authentic interactions with speakers of the target language (Aloraini & Cardoso, 2022, p. 1724) and be sensitized to a variety of accents, language variants and cultural aspects that they might not experience in the traditional classroom (Malik et al., 2019, p. 13). To instantiate, Herwanto (2022) mentioned that TikTok could be a good platform for practicing the language with native speakers. In the first weeks of the teaching period, the students tried to find TikTok videos from native speakers by searching key words and hashtags, for instance #Englishspeakingstudents, #practiceyourEnglish, and they produced reaction/duet videos with native speakers. Later on, they were divided into groups or pairs and created a role-play video in groups. Similarly, Lewin and Opsahl (2022) argued that by posting on TikTok, students can get feedback from others, which creates a learning opportunity to test their language skills and further develop their knowledge (pp. 25, 66). A growing number of students is indeed using social media for learning purposes, e.g. tutorial videos or clips on correct pronunciation or vocabulary learning in a foreign language, as well as for networking and interaction in English as a lingua franca.

Also in other subject fields, social media may be helpful to find reassurance, help and support from others (Almutairi et al., 2022, p. 13). This can have positive affective and relational effects (see also section 3.3 on learner engagement). According to the review by Malik et al. (2019), the use of Twitter can help to strengthen bonds and "comfort with peers" (p. 12). Similarly, English and Duncan-Howell (2008, quoted by Niu, 2019, p. 1388) reported that a Facebook course group increased learners' affective communication through encouragement and reinforcement. Finally, students might be more motivated to invest greater effort in assignments when they are posted (semi-)publicly on a social media platform (cf. Misnawati et al., 2022, p. 201; see also chapter 2 by Schluer regarding a redesigned introductory course).

Furthermore, the use of social media could also result in (meta-)cognitive learning gains through the sharing of resources (cf. Papademetriou et al., 2022, p. 16). More indirectly, learners can benefit from accessing a larger number of resources themselves (cf. Al-Qaysi et al., 2020, p. 2087; Handayani, 2016, p. 321; Papademetriou et al., 2022, p. 16). As a student remarked, it appears useful for indirect learning in the free time (Aloraini & Cardoso, 2022, p. 1721), thus complementing the more formal learning in the classroom. However, it needs to be borne in mind that anyone can create and disseminate content on social media and thus, the correctness of the information cannot be guaranteed but would need to be validated in other ways.

With reference to teaching methods, scholars have highlighted the affordances of social media according to collaborative, socio-constructivist learning approaches (e.g.

Dron & Anderson, 2014, cited by Perez et al., 2023, p. 4; Ruiz-Ruiz & Izaguirre, 2022, p. 3219). They emphasized that social media can “contribut[e] to open, flexible, and decentralized education” (Ruiz-Ruiz & Izaguirre, 2022, p. 3221, based on a study by Hermann et al., 2019). As presumably “powerful tools for collaborative learning” (Ruiz-Ruiz & Izaguirre, 2022, p. 3219), they promote student-centered pedagogies (Al-Qaysi et al., 2020; Camas Garrido et al., 2021) while seizing everyday spaces for educational purposes. Accordingly, social media help to break away from traditional roles of teachers as figures of authority, allowing multiple sources of knowledge and opinions (Ruiz-Ruiz & Izaguirre, 2022, pp. 3218–3219).

In fact, the reach beyond the classroom can also be fruitful for teachers, e.g. to gain teaching inspirations and collaborate with colleagues worldwide (cf. the review by Malik et al., 2019, p. 13). In their review, Camas Garrido et al. (2021) thus concluded that social media can “provide a boost” “in terms of active participation and multidirectionality”, “not only between teachers and students but also among peers, families, authorities, or other socialisation agents” (p. 141). For this, multiple features can be exploited, as sketched below.

3.2. Multiple Features and Flexibility

On social media, users may not only access and share resources, but they can also become content creators themselves (cf. Ruiz-Ruiz & Izaguirre, 2022, p. 3219). For this, the term “prosumers” has been coined, i.e. people who are simultaneously producers and consumers of goods, experiences and services (Toffler, 1970, quoted by Ruiz-Ruiz & Izaguirre, 2022, p. 3222).

Especially platforms such as Instagram and TikTok have turned into outlets of creativity, in which users draw on various media formats (Malik et al., 2019, p. 8) and communicate in multiple and multimodal ways (Barrot, 2021, p. 23). Features include text messages, image and video sharing, audio and video calls, likes and re-sharing as well as re-mixing of other contents (Barrot, 2021, p. 20). This makes those platforms useful not only for a variety of assignments for all skill areas of speaking, listening, reading, writing and mediation (cf. Handayani, 2016, pp. 324–326, regarding Instagram), but also for numerous feedback formats and strategies (Akbari et al., 2017, p. 41). For example, speaking activities could be recorded as TikTok videos by (pairs of) students (Ferstephanie & Pratiwi, 2021), e.g. as interviews or role plays (Herwanto, 2022), and commented on by reaction videos or written messages (see section 5 below). However, even though a variety of assignment and feedback types is possible, most published literature mainly dealt with written tasks on social media.

By drawing on one or several of the various features, users can engage in multidirectional communication and feedback processes (cf. Malik et al., 2019, p. 9). The exchanges can occur synchronously (in real time) or asynchronously (Forbes, 2017, p. 176), anytime and anywhere (Aloraini & Cardoso, 2022, pp. 1719, 1721; Papademetriou et al., 2022, p. 19). Indeed, availability and accessibility were among the most frequently cited advantages of social media in the study by Aloraini and Cardoso (2022), alongside their familiarity, user-friendliness and affordability (p. 1719). Beyond that, due to the digital environment, learners could additionally consult online resources, such as spelling checkers, dictionar-

ies and search engines to offer more accurate and elaborate feedback with more confidence (Akbari et al., 2017, p. 41)

Social media may thus support mobile learning (Suana et al., 2019, p. 1012) and feedback in various ways, which can increase students' engagement and creativity, as discussed next.

3.3. Learner Engagement and Creativity

Social media are trending, especially among young people (Ruiz-Ruiz & Izaguirre, 2022, p. 3218). To illustrate, TikTok has turned into "the fastest growing social media platform worldwide" since its launch in 2017 (Perez et al., 2023, p. 19), with over 1.1 billion monthly active users in 2023 (Ruby, 2023). Many students use it on a daily basis, either to access other's uploads or to create content themselves and interact with others. Due to students' familiarity with social media, it could be argued that the use of these apps might also increase their engagement in learning and educational feedback exchanges. Indeed, active student engagement (Ekahitanond, 2018, p. 686), "participatory information sharing" (Bikanga Ada et al., 2017, p. 71), collaborative learning and enhanced group performances were frequently adduced as advantages in previous papers (Perez et al., 2023, p. 21).

To exemplify, the use of Facebook encouraged student contributions in prior research (Ekahitanond, 2018, p. 686; Tran & Pham, 2023). For example, Tran and Pham (2023) compared peer feedback on the learning management system Moodle and the social networking site Facebook. The peer feedback on Facebook was found to be more impactful, with more improvements and higher writing accuracy in the Facebook group (Tran & Pham, 2023, pp. 889, 891). Similar findings were obtained in studies about peer feedback on Instagram, where learners actively read and commented on their fellow students' assignments (Misnawati et al., 2022, p. 211; cf. Mansor & Rahim, 2017, p. 111). Likewise, video creation on TikTok seemed to have motivational power and an impact on learning (Sinta & Zulfutri, 2022, p. 50), but research has not yet concentrated on feedback processes specifically. However, the utilization of the more established video platform YouTube has been studied already and positive motivational effects were detected. To instantiate, the feedback obtained from their peers triggered students' reflections on their learning (Sari et al., 2020, p. 394). Compared to the feedback tasks on Instagram and TikTok, YouTube might be considered as less attractive nowadays, since other platforms have become more popular and because YouTube videos are usually longer¹ and the possibilities for giving feedback are more restricted.

By contrast, social media apps, such as Instagram and TikTok, could increase learners' attention and involvement through short feedback sequences and novel feedback options (cf. Xiuwen & Razali, 2021, p. 1442; see section 5). The possibility of instant feedback has been emphasized repeatedly (Arulchelvan et al., 2019, p. 222; cf. Chintalapati & Daruri, 2017; Mansor & Rahim, 2017, p. 109), with multiple options for follow-up interactions. Not only the time to produce feedback, but also to receive the feedback can be

1 However, there is also a Shorts video format that resembles TikTok videos and can be reposted there.

reduced by using these social media applications (Desai, 2014, p. 145). Through the notification functions of the apps, these processes can be accelerated further (cf. e.g. Ekahitanond, 2018, p. 690, with regard to Facebook).

Not only students, but also teachers could exploit these features for feedback purposes. To exemplify, teachers might use the polling and commenting functions to obtain feedback from their students (Chen & Chen, 2012, cited by Lin et al., 2013, p. 40). For instance, Liu (2018) mentioned “using Twitter as a student response system” and as “a platform enabling two-way student-instructor communication” (p. 1). This can be especially useful in large classes (Liu, 2018, p. 1; cf. pp. 17–18), similar to other polling tools (cf. Mazur, 2013; see also chapter 6 by Scholz in this volume).

Overall, the various app features have the potential to innovate and extend feedback processes through creative explorations by learners and teachers (cf. Yunus & Salehi, 2012, p. 89). For example, through remixing, e.g. cutting and editing, novel feedback formats can be created (cf. Greenhow et al., 2009, p. 249) and learner motivation can grow (Niu, 2019, p. 1390). Even shy students might feel empowered to contribute actively due to the variety of features (concerning Twitter, cf. the reviews by Malik et al., 2019, p. 13, and Liu, 2018, p. 3). Inhibitions coming from greater power distances in the classroom could thus be overcome (cf. e.g. Chen & Chen, 2012, cited by Liu, 2018, p. 16) in favor of more student-centered teaching. Thus, social media platforms could provide an inclusive and comfortable environment that encourages their active participation (Aloraini & Cardoso, 2022, p. 1708, with reference to Cerdà & Planas, 2011). However, there are some challenges and limitations to be borne in mind, as will be expounded next.

4. Challenges and Limitations

Despite the many affordances that social media could offer, there generally has not been much empirical research about it. Moreover, several concerns have been raised about the use of social media in educational settings, including potential distractions, required resources and privacy issues. These points will be detailed in the present section.

4.1. Learning Gain Unclear

Regarding the potential educational impact of social media, it is worth noting that conclusive results about the effectiveness of social media for feedback purposes are still lacking (Ruiz-Ruiz & Izaguirre, 2022, p. 3219; cf. Mnkandla & Minnaar, 2017; Perez et al., 2023). Positive findings had mostly been obtained from very limited sample sizes and self-reports. For example, in studies about peer feedback on Instagram, there were only 30 students in the work by Ramadhanty et al. (2022, p. 9) and 32 students in the research by Nahru (2020, p. 46). Likewise, Twitter (X) as a feedback method in the classroom is not well-researched. While it is common to use Twitter for customer feedback (e.g. Couture, 2013; Fuoli et al., 2021; Guzman et al., 2017; Jacobson, 2017), there are only a few instances where Twitter has been introduced as a feedback method in education. Some sources, mostly websites, suggest using Twitter for giving bidirectional or multidirectional feedback in the classroom, but this practice has barely been investigated empirically.

Furthermore, it could be argued that feedback on social media tends to be shorter and thus less elaborate than feedback in other communication tools. This could be disadvantageous with respect to the level of detail that is conveyed. On the other hand, however, more frequent feedback cycles could be triggered by short feedback formats and quick responses. Whether this leads to greater interaction and learner involvement still needs to be tested empirically, though.

4.2. Required Resources and Possible Distractions

Social media nowadays appear ubiquitous, but nevertheless largely absent from classroom teaching. This could have infrastructural and pedagogical reasons (e.g. Cuevas & Kohle, 2010, p. 3598). First, not all schools have reliable and high-speed internet access, or they block the use of social media for a variety of reasons (Brook, 2011, p. 42). If students' (and teachers') personal devices need to be used, this could be problematic for several reasons. For example, some of them might not possess an up-to-date device, which would put them at a disadvantage. Moreover, students' (and teachers') internet quota could be limited (cf. Megawati et al., p. 123), which they do not want to spend on educational tasks. Likewise, at home, download rates might be restricted (Papademetriou et al., 2022, p. 4) or the internet connection could be slow or unstable (Mansor & Rahim, 2017, p. 112; Yunus & Salehi, 2012, p. 94). Teachers may also feel unprepared for using social media due to lacking experience and training (cf. Cuevas & Kohle, 2010, p. 3598).

One major argument against their utilization for educational purposes, however, are the potential distractions caused by the social media environment. Students are usually confronted with a huge amount of (oftentimes irrelevant) information in their social media feeds, which could distract them easily and thus negatively affect their task performance and learning (cf. Dunn & Rakes, 2011, cited by Sengupta & Vaish, 2023, p. 3; Khan et al., 2019, quoted by Almutairi et al., 2022, p. 2; Niu, 2019, p. 1385; Papademetriou et al., 2022, p. 4). For example, on TikTok and Instagram, they see countless off-topic posts on the start page and search site; on Twitter (X), the number of tweets can quickly become overwhelming (cf. the review by Malik et al., 2019, p. 15); on Facebook, learners might additionally be distracted by games and other add-ons (Yunus & Salehi, 2012, p. 95). Such an information overload could have adverse effects on students' concentration and performance (cf. Malik et al., 2019, p. 15).

Furthermore, learners might receive inappropriate or even derogatory messages and comments on their posts (Brook, 2011, p. 42), which could have a negative impact on their mental health. They might even be exposed to cyberbullying (Chen, 2015, cited by Papademetriou et al., 2022, p. 4; Xiuwen & Razali, 2021, p. 1447; Misnawati et al., 2022, p. 208), not only by their classmates but also by a wider, often anonymous, audience. Eventually, social media usage can also have negative consequences on their physical health, including sleep deprivation (Kolhar et al., 2021, cited by Almutairi et al., 2022, p. 2).

Certainly, there are precautions that can be undertaken to reduce these dangers (see section 5 below). Nevertheless, even when a separate account for educational use is set up, learners might be distracted and switch back to their private account. For example, Instagram shows a notification symbol for the second account even when one is using the

primary account. Learners could thus be inclined to switch to their private account while working on a classroom task. Much depends on students' and teachers' critical awareness of these dangers and distractions, as well as their attitudes towards learning via social media. The next section will tackle these broader aspects of learning culture and resistance.

4.3. Learning Culture and Resistance

While many students (and teachers) know social media from their free time “as a source of entertainment”, they usually do not associate it with a potential means to enhance educational processes (Kelsen, 2009, p. 9). As Kelsen (2009) noted (with reference to YouTube), “[t]his hardly seems surprising as [social media] [are] a pop culture phenomenon primarily designed to attract people for entertainment rather than education” (p. 9). It might thus be possible that teachers and students either do not make or do not want to make an explicit link between leisure time and learning.

Indeed, psychological resistance and traditional beliefs about pedagogy and education have been identified as significant drawbacks regarding the integration of social media in schools and universities (Perez et al., 2023, p. 2). It has been argued that social media might lead to an “erosion of teachers' traditional roles” as well as difficulties in managing relationships with students (Perez et al., 2023, p. 2). Bikanga Ada et al. (2017, p. 82) highlighted some students' and teachers' reluctance to embrace new forms of learning that deviate from the traditional approaches they are accustomed to in their courses.

On the one hand, educators might be unwilling to use new teaching methods that are different from the conventional approaches they have used for many years (Bikanga Ada et al., 2017, p. 82). In particular, the highly collaborative and co-constructive processes enabled by social media can reduce hierarchical distances and could make traditional educational approaches more vulnerable when exposed to an alternative reality of learning (see also chapter 3 by Liu in this volume). Additionally, some educators may face challenges such as time constraints in learning and developing new skills (cf. the review by Bikanga Ada et al., 2017, p. 82), especially since the technologies evolve continuously (cf. Perez et al., 2023, p. 4; Mnkandla & Minnaar, 2017, p. 228). The ongoing changes can thus be considered a reason why education lags behind with regard to incorporating social media into teaching and learning (Mnkandla & Minnaar, 2017, p. 228). Teachers would need to be willing to learn continuously, also from and together with their students.

Likewise, in the survey by Gettman and Cortijo (2015), students considered “Facebook to be a social medium instead of an academic tool” and “felt uncomfortable interacting with instructors on Facebook” (as paraphrased by Niu, 2019, p. 1392). On a similar note, “Madge et al. (2009) cautioned that educators should not rush to move into “a social networking space that students clearly feel is ‘theirs’ for social rather than academic purposes” (p. 152)” (Niu, 2019, p. 1395).

In addition, there could be social and cultural challenges in some educational settings with regard to the content that is posted, e.g. concerning politics or religion. To instantiate, in the project by Al-Ali (2014), “students were instructed not to show any female faces in their pictures” (p. 14) to avoid potential cultural conflicts.

Moreover, not only students, but especially instructors might fear a 24/7 availability due to social media use (Liu, 2018, p. 3). The usage can become highly time-consuming and intrusive to their personal lives (Grosbeck & Holotescu 2008, quoted by Liu, 2018, p. 3). They may therefore prefer to separate private and professional life (Bikanga Ada et al., 2017, p. 79; Almutairi et al., 2022, p. 14), as will be further discussed below.

4.4. Privacy

As we have seen above, social media are rather used in private contexts and/or for commercial purposes, whereas in the teaching context social media are debated or even banned. This can result from the wish to keep private and professional lives separate, but also from the dangers of bullying as well as the fake news which are spreading in social media (cf. Papademetriou et al., 2022, p. 6).

While many students actively post on social media in their free time, they could feel inhibited to create posts for educational purposes. On the one hand, they might be reluctant to posting academic content on their personal profiles because this could “have a negative impact on their social presence” (Al-Ali, 2014, p. 10) and carefully crafted profiles. Additionally, students might not want teachers to be part of their social networks, and vice versa (Dunlap and Lowenthal 2009; Hodges 2010; both cited by Liu, 2018, p. 3). By implication, not only the learning-related posts, but also posts from their free-time would become visible to their teachers.

However, also students who are not yet active on social media could feel “exposed and vulnerable” and lack “the confidence to post” (Forbes, 2017, p. 183), especially when posts are made public. For example, they might feel a “pressure [...] to use very good grammar, punctuation, and content in their comments because everyone will read the comments posted” (Yunus & Salehi, 2012, p. 94). Notably, speaking activities, e.g. on Facebook Live (Ekahitanond, 2018) or in TikTok videos, might not be preferred by some students, especially by shy and introvert students. Apart from bullying from their peers or general public (Papademetriou et al., 2022, p. 4), they could fear additional privacy threats, e.g. through the creation of fake profiles with their pictures.

To some extent, the anxiety about sharing content publicly might be alleviated by adjusting the privacy settings of the account and posts (Brook, 2011, p. 42). In addition, setting up a separate account is recommended (Lin et al., 2013, pp. 43–44) to ensure “a clear boundary between social and learning activities” (Niu, 2019, p. 1392; McCarthy, 2017, p. 130) and to keep personal and educational profiles apart (Bikanga Ada et al., 2017, p. 79; Almutairi et al., 2022, p. 14). Students might even use pseudonyms rather than real names and avatars instead of profile pictures to preserve anonymity (Demirbilek, 2015, p. 221; see chapter 14 by Bekci in this volume). On the other hand, however, teachers could then have difficulty in tracking each students’ contributions (Al-Ali, 2014, p. 11) unless the pseudonyms are known to the teacher. For example, they could set up a list of students’ names and their chosen online alias. These and other precautions may help to make social media a safer space for use in educational contexts. Further suggestions for implementation will be shown below.

5. Suggestions for Implementation

In light of the above-mentioned challenges and the novelty of social media apps, there is still a lack of practical information on how social media can be used in the classroom by teachers and students alike. Given this gap, social media features have therefore been considered in the project “Pedagogical Guidance for Using Digital Feedback: Digital Feedback Map (DFM)”, conducted by Jun.-Prof. Dr. Jennifer Schluer and funded by the *Stiftung Innovation in der Hochschullehre* (funding ID: FRFMM-181/2022, from 09/2022 to 11/2023). Literature searches did not yield many usable results with specific respect to feedback procedures on social media in educational contexts. Therefore, the features of different social media apps were explored openly to derive suggestions for implementation. They will be briefly described in the following sections, preceded by general recommendations and an overview of the features. Readers are also encouraged to visit the “Digital Feedback Map (DFM)” website that contains more detailed written and video manuals as well as handouts in an openly accessible form (<https://tinyurl.com/DigitalFeedbackOverview>; Schluer, 2023). The aim is to progressively update the DFM website, given the dynamic developments in the field.

5.1. General Steps

As with any new approach, adequate preparation through stepwise familiarization is key (cf. Schluer, 2022). The following general advice is deduced from suggestions made in the feedback literature and from the features of specific social media, notably Facebook, Instagram, TikTok, and Twitter (X).

Should feedback (including peer feedback) not yet be an established practice in the classroom, learners would need to be introduced to the concept first and be granted sufficient time for practice (cf. the steps described in Schluer, 2022, pp. 35–44). This includes strategies for seeking feedback, exchanging feedback and utilizing feedback as well as for managing emotions during feedback provision and reception (cf. Carless & Boud, 2018). Through a variety of (individual and collaborative) activities and concrete examples of feedback practice, a thorough understanding of assessment criteria and a trustful atmosphere for constructive feedback can be created (cf. Hattie & Clarke, 2019; Sun & Doman, 2018). Furthermore, teachers need to craft pedagogical designs that incorporate feedback activities regularly and reasonably (Boud & Dawson, 2023; Carless & Winstone, 2023, pp. 153–154). This also includes appropriate choices regarding the technologies that are deployed for specific feedback purposes (Carless & Winstone, 2023, p. 154; cf. Aloraini & Cardoso, 2022, p. 1707). In that regard, also the internet and social media policies of the school or institution need to be respected to ensure a safe and enjoyable experience for everyone in the classroom. Teachers should check whether the institutional learning platform or cloud offers similar functions to social media tools, or whether using fake messengers would be the better choice. **Fake messengers** imitate the interface of social media to allow students to test their functions. Using them does not require a real social media account, which could be beneficial for practicing purposes at schools, during internships, or teacher training. However, fake messengers are severely limited with re-

spect to their interactive features and the directions as well as modes in which feedback can be exchanged.

Next, as soon as pedagogical decisions regarding suitable tools have been made, learners must be introduced to the relevant features of the platform or app (cf. Schluer, 2022, p. 36). For this, tutorial videos and step-by-step guides could be shared with the students (see e.g. the “Digital Feedback Map” (DMF) at <https://tinyurl.com/DigitalFeedbackOverview>; Schluer, 2023). Especially if manuals about a specific app and its features do not yet exist, teachers should model the procedure by creating feedback themselves in those ways (e.g. by using earlier assignments). Students can revisit these models and examples whenever needed (cf. Al-Ali, 2014, p. 10; Edwards, 2022). In case learners are already familiar with a particular social media app, it makes sense to actively involve them as co-teachers in this training phase. They could explain the functions to their fellow students and to their teachers, which helps cultivate an atmosphere of mutual learning and active engagement in the classroom. Learners might even be asked to co-create written or video manuals for the classroom. In fact, this procedure was applied in a TESOL methodology seminar in summer term 2023, resulting in eight video tutorials for the DFM (see chapter 2 by Schluer on course re-design in this volume).

However, while many learners will probably know social media from their leisure time, a utilization within the educational realm might strike them as uncommon (cf. Demirbilek, 2015, p. 221). Therefore, the purpose of using social media for learning-related feedback interactions should be explained to the students. For this, a brainstorming activity could be conducted together with the students, during which learners and teachers present their ideas. Moreover, students should have the chance to voice their questions and concerns, e.g. about privacy and cyberbullying. Often, it is advisable for everyone to set up an additional account on the social media app that is to be used exclusively for educational objectives or for a specific classroom. Moreover, it is possible in many apps to set up a dedicated group site or a classroom chat, e.g. a Facebook group or page (Queen Mary University of London, 2020) or a Telegram channel. Typically, it should be configured as a private page to which only the classroom members (and maybe also the parents, depending on the age of the students) have access. Likewise, students should create new (private) accounts for classroom activities and should only allow their classmates to follow their profiles so that interactive activities (react/duet) can be limited to these followers. Apart from restricting the range of commentators, the “settings can be changed to require that either the teacher or the students must approve any comments on the videos before they are posted [...]” (Brook, 2011, p. 42, with reference to YouTube).

Furthermore, the settings for the feed on the app's start page should be adjusted. For instance, on TikTok and Instagram, there are three options for the main feed: “for you”, “following” and “favorites”. In the “following” page, users can only see the posts of the persons they follow, while “favorites” exclusively shows content from the persons they have marked as favorites. Depending on whether students merely follow their fellow students and teacher on the social media account, one of these two options would be recommended. If they follow other people as well, they could mark their classmates and teacher as “favorites” to view their posts on the home feed. By contrast, the selection “for you” might include countless of distractive and dangerous contents.

After a specific feedback purpose and appropriate digital tool have been determined, the participants should agree on clear guidelines for participation, content sharing, and netiquette. Students might need practice for trying out relevant features and should have the opportunity to ask questions. In that respect, a stepwise progression is recommended. For instance, on Twitter (X), students might try out retweeting first before creating new posts on their own (Forbes, 2017, p. 182). This might also help to overcome fears and barriers regarding the usage of a new tool.

For conducting peer feedback activities, it might be a good idea to limit the number of participants in peer-feedback groups to about four or five students. Otherwise, the reception of too many comments might be confusing and overwhelming for the students. Likewise, learners might be demotivated to provide feedback to a large number of peers. If the group size is kept at a minimum, it would also be possible to conduct consecutive activities and explore a greater variety of feedback modes rather than focusing on one skill (e.g. writing) or feature only. In small groups, student could thus share recorded voice or video messages, reels, images etc. without being flooded by (unimodal) information from numerous peers.

After these organizational issues have been clarified, the learners need time to work on a task. Feedback processes could already occur during collaborative creation, or they could be sequenced after the first draft submission. Either way, students need clear guidance about what to do when and whom to ask about what. Active participation should be encouraged, including help- and feedback-seeking as well as providing and acting on the feedback received. For this, they can explore a variety of features, such as comments, likes, chats, polls, and file uploads. Teachers should monitor these processes throughout, offering guidance and facilitating discussions, especially at early stages. Learners should also be asked to reflect on their own work as well as the feedback they have given and received. They should explain in how far the feedback was useful for them and in what ways they have implemented it. Teachers should likewise share their feedback about the learners' work, synthesizing points that fellow students had mentioned and adding additional ones if needed. This supplementary instructor feedback will be based on the predetermined assessment criteria to enhance students' learning experience and will offer further models for learners' own subsequent feedback practices. Learners will then be asked to utilize the feedback to improve their learning, e.g. when revising a draft or working on another assignment.

In addition, teachers should provide feedback on the feedback that the students have exchanged. This will help to improve learners' feedback literacy. In that respect, the classroom page, channel, or chat will serve as a record of students' work and feedback literacy development, which could be used for reflections at regular intervals (e.g. mid-term and end-of-term). It might also be shared with parents or a wider audience (e.g. school or district instead of a classroom) to showcase students' progress and project work (cf. Edwards, 2022; Lynch, 2018).

At any rate, teachers should appreciate the students' contributions and progress while simultaneously acknowledging the challenges they encountered when using social media for educational (in particular feedback) purposes, especially when it was done for the first time. Overall, social media could thus turn into a site and source for formative and summative assessments in a variety of ways.

5.2. Overview of Common Social Media Features

Due to their countless features, social media can support feedback processes in numerous ways. Table 1 provides an overview of several common social media features that can be utilized for feedback purposes.

As the table shows, interactions can occur in various ways on social media, such as through likes, hashtags (#), written comments below a post (image or video, esp. reels), via direct messages, reposts with additional comments (re-posting a post to another user account) or other forms of sharing posts (in stories or direct messages) or remixing them with new contents (changes to existing posts by adding new text, image, video and/or sound elements) etc. Many of these reactions can be regarded as a form of feedback to the contributor. Given the variety of functions, the apps can be used for different kinds of learning tasks as well as for feedback on the processes and products of solving these tasks (cf. Hattie & Timperley, 2007). Nevertheless, in view of their distinct features, some of them might be more suitable than others for specific learning objectives. In the following sections, the feedback options will be described in more detail, together with possible areas of application. The overview will begin with a description of quick reaction features, followed by various types of video feedback, and finally a synthesis of several additional features.

Table 1: Overview of Feedback Strategies Enabled by Different Social Media Tools and Platforms

Feedback Strategies	Instagram	TikTok	YouTube	Facebook	WhatsApp	Twitter (X)
Written feedback via text messages	Direct messages	Messages	-	Direct messages	Text chats	Direct messages
Written feedback via comments below posts	+	+	+	+	(replying to a preceding message)	+
Audio Calls	+	-	-	+	+	-
Audio Recording	+(audio messages)	+	-	+	+	+
Video fb via Reels	+	+	+(Shorts)	Reels	WhatsApp Status	-
Duet	Remix	+	-	-	-	-
Stitch (React)	-	+	-	-	-	-
Live Classroom (Synchronous)	(Instagram Live stream)	(TikTok Live stream)	(YouTube Live stream)	(Facebook Live)	(video/audio calls)	(X Live)
Poll Feedback	+	-	-	+	+	+
Voiceover Feedback	-	+	-	-	-	-
Avatars	+	-	-	-	+	-
Simultaneous Front & Back Camera	+	+	-	-	-	-
Groups	+(for direct messages)	-	-	+	+	+
Likes	+	+	+	+	+	+
Emoji sliders	+	-	-	-	-	-
Hashtags	+	+	+	+	-	+

5.3. Using Quick Reactions for Feedback Purposes (Likes, Polls, Emoji Sliders etc.)

This section introduces social media features that can be used for feedback via quick reactions. Quick reactions can be defined as one of the more basic features for delivering feedback in a simple and fast way. For instance, TikTok includes several options for quick reaction purposes, such as likes, comments, and direct messages. Facebook also provides similar features, including direct messages, comments, likes, sharing functions etc. Besides these functions, Instagram offers two additional features that can be used for quick reaction feedback: polls and emoji sliders. So far, especially the latter seems to be unique to Instagram, and does not (yet) exist on Facebook or TikTok. Twitter, in turn, offers quick reaction feedback through features like retweets, likes, and replies, enabling users to engage and express their opinions. Similarly, YouTube incorporates quick reaction feedback functionalities including likes, dislikes, comments, and the option to share videos, allowing users to interact and provide feedback. These functions will be discussed in a detailed way in the following parts.

Facebook was one of the first social platforms that introduced several features which have now become a common component of other social media. They can be utilized for manifold feedback purposes, including quick feedback. Notably, the texting feature of Facebook is one of the very first examples of text messaging via social media. Facebook has also developed a separate texting application called “Facebook Messengers”. Learners can download this application on their phones to use it for feedback purposes without needing a personal computer. The commenting function of Facebook has also become very popular and can be used for writing activities, for instance. Accordingly, learners can upload one of their writing texts and ask for feedback from their peers and/or instructor on Facebook. In the second step, the peers and/or instructor use the comment section to leave their written feedback (cf. Demirbilek, 2015, p. 215). Furthermore, they can utilize the comment section of Facebook as a forum to start a discussion.

On **TikTok**, users likewise find features to give quick feedback reactions. To use TikTok for feedback purposes, learners should first create or upload their language products (presentations, role-play or speaking videos etc.) to the platform. For these, they can utilize several video effects (see section 5.4 below) and might even create their own 3D Avatar to preserve their anonymity on the web (cf. Bekci in chapter 14 regarding Instagram). Afterwards, the peers can navigate to each other’s video. TikTok offers plenty of quick reaction functions to provide asynchronous feedback in a classical way, such as written feedback via text messages. Moreover, to express their positive thoughts on the video, peers can simply like it. Furthermore, to give more detailed feedback, they can use the comment section below the post. Also, they could navigate to their peers’ account and start a private conversation to exchange their written feedback in a dialogical manner. Via this function, the peers can also start a discussion on the given feedback to deepen their understanding.

Instagram is likewise valuable for numerous tasks, especially those that can be shared as a picture or video file. However, it has also been used for feedback on writing activities (cf. Ryandini, 2019, p. 107; Tahapary et al., 2020, p. 212). On the one hand, creators can write a suitable caption (Misnawati et al., 2022, p. 199), e.g. a story, below a

picture or video they have shared. On the other hand, they could also save a short story, essay, paragraph, poem or other writing activity as a picture or video file (cf. TikTok above). Since 2023, it is even possible to post content together with another user, making this activity suitable for collaborative learning. They can also try out different filters and templates to share posts in creative ways (Ruiz-Ruiz & Izaguirre, 2022, p. 3222).

After a picture or video post has been uploaded, users have a wide variety of options for quick feedback on Instagram. This includes likes and comments (Ruiz-Ruiz & Izaguirre, 2022, p. 3222), polls as well as re-posts and private messages. The direct message (DM) feature on Instagram offers classic texting features plus Instagram-based features such as snapshots, instant short videos, emojis etc. Creators can also include a poll below a post to seek specific feedback from others. Moreover, the commenting function of Instagram can be utilized in several ways. First, users can upload a reel or photo and their peers can then leave a comment (written feedback) below these posts (Misnawati et al., 2022, p. 212; Tahapary et al., 2020, p. 212). Alternatively, they can repost the submission (e.g. by using the Regram app) or share the post in their own story to leave additional feedback. Another option is that learners reply to other users' stories. This can occur via likes, avatars, or direct messages as well as the resharing of stories.

Another unique function are emoji sliders in Instagram stories. Via emoji sliders, users rate their peers' contributions by sliding the emoji bar from the lowest point to the highest. Furthermore, quizzing and polling can also be included in Instagram stories. Students (or teachers) can write a question together with an open-response field, with a yes-or-no vote (or similar) or in a multiple-choice style. With these options, it is important for learners to be able to write fitting poll questions to receive the desired feedback. Similarly, teachers can conduct quizzes to test learners' knowledge and obtain feedback on the clarity of their preceding explanations.

On **Twitter**, users can likewise engage with the content and provide feedback in several ways. By liking a tweet, students can show their approval or acceptance of the content. Moreover, they can bookmark interesting tweets for future reference. Quoting or retweeting a tweet, i.e., sharing it with their own followers, can be a form of endorsement and helps increase the reach of useful or entertaining content. Replying to a tweet is a more direct approach to getting more in-depth feedback or joining a conversation. Thereby, users can share their thoughts, ask questions, or offer feedback directly to the author of the tweet, e.g. the teacher (Cox, 2020) or peer. They might also disseminate links to more complex surveys (cf. Cox, 2020; Norman, 2016) or to additional resources. Furthermore, emojis can help to convey emotions and disambiguate the intended sense of the message. Moreover, mentions and hashtags can increase the probability that the feedback reaches the intended recipient. Regardless of the method used, it is important to keep the feedback constructive and respectful to encourage positive interactions and meaningful discussions. In addition, Twitter's poll feature allows users to engage with their followers by organizing quick and interactive polls.

On **YouTube**, user engagement and feedback mechanisms have also evolved to include a variety of interactive features. Traditional "Like" and "Dislike" buttons provide immediate feedback for creators, while text-based comments encourage discussion. The general public can only see the number of likes, though. It is important to point out that Instagram (and perhaps other apps) does not have a dislike button to reduce the dangers

of cyberbullying. In the current version of YouTube, only the creators can view the count of dislikes, while the general audience can only see the number of likes. In addition, the community tab allows for continuous engagement through text updates, images, and polls. Creators benefit from audience interaction metrics in YouTube Analytics that provide valuable insights into how viewers interact with their content. These features improve the feedback loop between content creators and their audience, making YouTube a dynamic platform for interaction and expression.

5.4. Exchanging Video Feedback on Social Media

In this section, several video features of social media platforms will be introduced. TikTok is presumably the most popular short-video platform among the social media applications. It provides many options that can be used to deliver video feedback, including Duet, Stitch (React), and voiceover functions (for the latter see chapter 13 by Altay in this volume). Instagram offers similar functions through the Instagram Remixing option. Moreover, with Instagram stories and reels, further opportunities for video feedback arise. Even though Facebook is not known for its video-sharing features, it offers a few video feedback options. In particular, it provides similar features to reels and stories, but they are limited in functionality as compared to Instagram and TikTok. However, Facebook Live can be considered a suitable option for synchronous feedback on social media. Additionally, Twitter, while primarily text-based, allows users to share videos and engage with video content through replies and retweets, extending its capabilities beyond its original text-centered format. These functions will be discussed in a more detailed way in the following paragraphs.

As a short-video platform known for its countless video editing functions, **TikTok** offers numerous options to create and modify videos for feedback purposes. To do so, learners should first upload their creations (e.g. language products) to the platform. For instance, they could create a role-play video, e.g. by imagining themselves as an anchor person of their favorite TV channels and pretending to present sports news. In this way, students can practice their English skills in a fun and interactive way. Besides speaking or role-play activities, TikTok can likewise be utilized for writing activities, albeit in a limited way. Students can share their own writing (a short story or a short paragraph) alongside with background effects (green screen) and music. They may also use the slide function of TikTok to create a recorded presentation on TikTok. In the second step, peers can exchange feedback by using one of the following video features of TikTok: TikTok Duet function, TikTok React function, and TikTok Voiceover function (cf. Sinta & Zulfutri, 2022, pp. 47–48).

Duets allow feedback providers to build on another user's video on TikTok by recording their feedback video alongside the original. Numerous effects, such as greenscreen, can be chosen to enhance the visual appeal. Duet is thus a creative format for interacting with others' videos, building on existing stories, but also for creating new and unique content in collaboration with creators across the platform. Hence, in duet videos, two TikTok users can collaborate in split-screen mode, e.g. to practice feedback conversations or to act a scene. Examples include a role-play between a customer and a salesperson or a

doctor and a patient. However, duet videos are only between two persons whereas react videos can include more users.

Stitch (React videos) is another special feature of TikTok that can be employed for feedback purposes. In stitch videos, users select a small part of another user's post on TikTok (minimum of 1.0 second and a maximum of 5.0 seconds) and then shoot their own video. During editing, they may also add effects and adjust the length of the reaction video. This function can be perfectly utilized for feedback purposes, for example to give feedback on pronunciation or specific parts from a presentation. The teacher or peers select the relevant part of the original video in which they want to emphasize a point or give feedback on. Afterwards, they record their feedback video, which will play after the selected sequence from the original video.

The voiceover function of TikTok is also unique to TikTok, enabling the creation of screencast feedback on social media. To use this function, learners should first download or save their peers' videos to their galleries. Afterwards, they edit it for feedback purposes. With this feedback tool, learners can reduce the volume or completely remove the sound of the original video and start recording their own voices at any point. If the original video, for instance, consists of the learner's written text, peers can easily utilize this effect to provide screencast feedback (see also Altay in chapter 13).

By using voiceover, students do not need to show themselves in the video. However, also in the other video formats, it is not necessary to turn on the cameras and/or audio recordings. Instead, students could create a (3D) avatar, or use a black screen or a background image with greenscreen effect to write a story (e.g. about their favorite influencers or free-time activities). Depending on the length, this story could also be posted sequentially (part1, part2 etc.). Especially for shy and introvert or underage students, this could represent a reasonable alternative to posting their audio and video on a social media platform. In the assessment and feedback process, respondents can also use the stitch or duet feature of the platform in a similar way to either expand the story or give reactions to it.

Furthermore, **Instagram** is known for its innovative video-story options even though it first emerged as a platform for photographers. A story basically is a snapshot or a snap video, shorter than a minute, that captures the moment and allows users to share it with the public or their followers. These Instagram stories could be used to exchange feedback via short videos. For instance, learners may share something with their peers and ask them for feedback via a short video format, and in return they might obtain feedback via Instagram stories as well. This can be combined with the quick reaction features described above. Furthermore, users may choose to reply to stories via messaging or by utilizing the video features of Instagram in stories and reels etc.

Another noteworthy function is the use of simultaneous front and back cameras. This feature can be implemented to create a special kind of screencast feedback video with a talking head (cf. Schluer, 2022, pp. 185–207). Therein, users live-record themselves with the front camera while filming a real-world object or scene they want to comment on. In the feedback clip, the speaker video will be visible in a corner while the rest of the screen will be a recording of the object or scene being commented on.

The Instagram Reels function can represent another feedback tool as it supports longer videos (up to 90 seconds) than Instagram stories. In response to Instagram Reels,

other learners can use the “Remixing” function of Instagram. Similar to the “Duet” feature of TikTok, Instagram’s Remix offers a wide range of opportunities to provide video feedback.

Even longer videos can be shared via the platform YouTube. **YouTube** has been used for educational purposes for a long time, notably for sharing a (feedback) video and/or commenting on existing ones. By uploading their own videos to YouTube, users can share their recorded screencast video feedback or talking-head video feedback, for instance (see also Schluer, 2022, pp. 174–184). They could simply record themselves while assessing a learner’s submission and explaining their ideas and perspectives. Subsequently, they publish their video on their YouTube channel, allowing others to watch and respond to their feedback. This can occur via a direct link that is only accessible by the individual learner or by the classroom. Alternatively, the video could be made public so that the community of YouTube users might provide feedback as well. For this, however, consent should be obtained from the learners (and the parents, if underaged).

A common video feedback type on YouTube are so-called “reaction videos”. Thereby, feedback providers utilize an existing video in order to comment on it, similar to a combination screencast video with talking head (cf. Schluer, 2022, pp. 185–207). As Passaris (2022) explains, there are typically two kinds of YouTube reaction videos, which are “split-screen” and “picture-in-picture”. Split-screen means that the original and the reaction video are placed “side-by-side on the screen” (Passaris, 2022), whereas picture-in-picture displays the reaction as an overlay to the original video. The reaction video is then usually shown in a corner of the screen. In addition, it is possible to insert the reaction in full screen at regular intervals, i.e. after a specific sequence of the original video has been played. The duration of those videos can vary, depending on the purpose of the reaction video and the content that is commented on.

Furthermore, with the YouTube Shorts feature, users may create short video clips, which are less than a minute long. In this way, they can provide fast feedback or reactions to any submission, including other videos that have already been uploaded to YouTube. For this, they have at least three different options. First, they can use “Remixing with Voiceover” to comment on an existing video. The original video will play without sound, while the feedback provider comments on the submission, explains the assessment and gives suggestions. Second, the option “Remixing using Cut” entails changing the video to highlight the points they want to comment on specifically. Hence, longer videos will be cut, with only relevant parts being focused on. The third option is “Remixing using Green Screen”. Here, the learner submission (e.g. video, document, photos, slides) will remain visible in the background while the feedback provider can show additional materials and/or their speaker video in the foreground. This is similar to screencast feedback combined with a talking-head video. Overall, the use of these features can make the video feedback on YouTube more effective and engaging.

In contrast to YouTube, TikTok and Instagram, **Facebook** is not a platform that has been designed for the dissemination of (short) videos. Nonetheless, Facebook offers some features that can be exploited to exchange feedback via video. Notably, Facebook has a function that is similar to Instagram stories. Via this function, learners can share their short videos and receive feedback in return via comments or direct messages. Another feature is Facebook Live, which appears suitable for live presentations or role-

plays (cf. Ekahitanond, 2018, p. 688) and serves as an alternative to other webmeeting apps, for instance. With this option, peers/instructors can leave synchronous feedback via comments, emojis, the live chat, and the polling feature.

On **Twitter**, it is also possible to share videos, either by uploading them directly or by sharing links to platforms like YouTube. Additionally, Twitter's own video feature allows users to record and post short video clips, enhancing the platform's capabilities for content sharing and engagement. In addition to sharing videos directly or from external platforms such as YouTube, Twitter offers options such as live streaming or Twitter Spaces for audio conversations as well as video polls, thus providing several multimedia engagement opportunities.

To conclude, while YouTube has been utilized for video sharing and commenting in a variety of subject fields, only some teachers and students employed it for the exchange of educational feedback. The potentials of other social media platforms and the creative video formats they offer have hardly been examined so far. This includes short videos, such as YouTube Shorts or reels on Instagram or TikTok. Notably, the shorter video format (up to 60 seconds for YouTube Shorts, 15 or 60 seconds on Instagram stories, or 15 seconds to three minutes on TikTok etc.) can be advantageous to foster engagement and reduce the time needed to produce feedback videos. Moreover, the various integrated recording and editing features might increase learner engagement and creativity. To exemplify, dual-camera, split-screen or overlay (greenscreen) effects facilitate the production of innovative feedback formats and do not require sophisticated technical equipment. While powerful computers with a costly video editor, camera and external microphone were previously needed, a smartphone that meets current requirements would be sufficient for video feedback exchanges via social media. Possible limitations, as they have been cited in previous studies on video feedback, are thus reduced.

5.5. Exploiting Additional Features for Feedback Purposes (Hashtags, Groups etc.)

Features that go beyond the previous two categories but could likewise be effective tools for feedback purposes will be introduced in this section. The most important example of these features are hashtags, which exist on almost every platform. On Twitter, for instance, hashtags are a crucial part of the platform, helping users join conversations and discover relevant content by clicking on or using hashtags in their tweets. On Instagram, TikTok and YouTube, hashtags are useful to categorize and discover videos, allowing creators to make their content more accessible to viewers. However, other options cannot be found in every app. For instance, "Avatars" can be used on WhatsApp, Instagram, and TikTok; however, they are not (yet) available on Facebook and YouTube. Furthermore, on Facebook and WhatsApp, users can create groups to form a collaborative space for feedback, whereas on other platforms, including TikTok, a grouping function cannot (yet) be seized. On Instagram, it is so far only possible for users to create groups in direct messages. The following paragraphs will explain some of these functions in more detail.

Overall, hashtags can be used for different scenarios to give and receive feedback. First of all, it is recommended to define specific hashtags for a course (Dragseth, 2020, p. 255; Evans, 2013, p. 46; Forbes, 2017, p. 183; Lin et al., 2013, p. 44), topic (Al-Ali, 2014,

p. 6) or assignment, e.g., #TESOL2024TUC and #TESOL2024task4. To instantiate, Dragseth (2020) combined the course number and department code, such as #CAS2033 and #PADM7925, to tag relevant tweets (p. 255). With these unique hashtags, posts and feedback can be grouped according to class, lesson, or topic. Next, all students need to follow the hashtag in order to be informed about recent posts pertaining to the classroom or assignment. Moreover, it is possible to search for and pool resources as well as filter feedback using these hashtags. To exemplify, in the report by Al-Ali (2014), students tracked photos by utilizing unique hashtags on Instagram (p. 6). In addition, hashtags can help to create affinity groups with a wider community, e.g. related to specific skill areas, professions, or recent debates (cf. Bledsoe et al., 2014, cited by Malik et al., 2019, p. 12; Newton & Williams, 2022, p. 447). For example, the hashtag #teachergram addresses the broad community of teachers on Instagram to “build [...] collegial support and collaboration beyond the limits of their own school or district” (Newton & Williams, 2022, p. 451). Other common hashtags are #teachersofinstagram (Lynch, 2018) or #instalehrerzimmer (in Germany), which allow educators to share teaching ideas or gain new inspiration from others for their own classrooms, respectively (cf. Newton & Williams, 2022, pp. 450–451).

#TeachersofTikTok, on the other hand, is a hashtag that enables teachers to share their experiences on TikTok. On **TikTok**, for example, the person who is uploading the video can ask for feedback via the hashtag feature. To do so, they should edit the caption before posting their videos, for instance by asking direct questions so that the viewers (e.g. peers) will focus on more specific points to give feedback, e.g. #HowcanIimproveyourgrammar? A major advantage of following specific hashtags is that the students and teachers do not need to follow each other on the platform (Lin et al., 2013, p. 44). This helps to overcome the reservations sketched in the previous literature about allowing teachers and classmates to access private profile pages (see section 4.4).

On **Facebook**, there are many alternative options that could enhance the feedback experience. Notably, Facebook was one of the first social media platforms that introduced the “group function” on social media. Facebook groups can even be utilized as a virtual classroom in which learners and instructors share their language products and exchange feedback. It is especially suitable for writing activities, but also for others. To instantiate, learners could share their writing texts and peers can leave their written feedback in the comment section (cf. Akbari et al., 2017, p. 34). Another alternative option is the “Facebook Pages” function. In contrast to Facebook groups, only the moderators of a Facebook page can share a post. Accordingly, instructors might use Facebook pages to start a discussion, with learners exchanging feedback in the comments section.

On **Instagram**, users can find many further features to support their feedback process. Users could create groups on Instagram via the direct messaging feature (cf. Mansor & Rahim, 2017, p. 112). They may then use this group chat feature as a collaborative place to exchange feedback. Certainly, the tagging of particular persons via their account’s name (@username) as well as hashtags can also be utilized to give and receive feedback on Instagram.

Indeed, hashtags are **Twitter**’s most common feature. They allow users to categorize and discover content related to specific topics, trends, or events. This can refer to older posts as well as to live discussions (Liu, 2018, p. 4). For example, Liu (2018) encouraged

students “to live-tweet any questions or comments using the course hashtag during the lectures” (p. 6). Moreover, lists enhance content organization and personalized feeds by providing a means to organize the accounts followed. The “Spaces” feature enables voice-based discussions, providing a dynamic platform for real-time conversations and differentiating Twitter from platforms that focus primarily on text. Finally, Twitter (X) allows users to tag others in tweets by simply typing “@” followed by their Twitter handle (e.g. “@Feedback2023”). This feature not only brings attention to the mentioned user but also generates a quick access to their profile, making it easier for others to discover and engage with them in the conversation.

This tagging feature is also available on **YouTube**. Moreover, content creators can build communities of subscribers by setting up their own YouTube channels. Especially live streaming on YouTube adds a dynamic dimension, allowing creators to broadcast real-time video content, which is suitable for live events and interactive discussions. YouTube Shorts, a response to the popularity of short-form video content, e.g. on TikTok, enables users to create and watch videos that are up to 60 seconds in length and facilitates re-posting across different social media platforms. Finally, hashtags can be inserted in the video description of YouTube Shorts, which may eventually increase the discoverability of the Shorts content.

6. Discussion: Future Avenues and Open Questions

By granting students the opportunity to assume the role of content creators, social media platforms foster creativity in content generation, enabling learners to engage with a wider audience and receive valuable feedback (Ruiz-Ruiz & Izaguirre, 2022, p. 3219). Students and teachers might even jointly develop learning and feedback formats on social media, which could be attractive and effective, especially for younger learners. This would help to maximally seize the student-centered and collaborative capabilities that could be afforded by the use of social media.

In that respect, teachers play a central role in the meaningful and effective integration of social media for learning purposes (as reviewed by Camas Garrido et al., 2021, p. 142). Throughout the learning and feedback process, they act as facilitators or mediators within the participatory spaces enabled by social media (cf. Camas Garrido et al., 2021, p. 142). As stressed by Forbes (2017), this requires a “complex set of understandings [that] must be underpinned by awareness of ethical and social responsibilities” (p. 176). An important first step is the choice of a suitable course design as well as of appropriate tools which help to reach the intended learning objectives (see also chapter 4 by Schluer on the feedback taxonomy). This way, social media activities will be limited to clearly defined purposes only. Additionally, teachers should strive to minimize the distractive and dangerous effects of the selected social media platform. To exemplify, uploads and conversations should usually only be visible to the members of the classroom and not to others. In that respect, advancements in the field of AI may also help to preserve students’ privacy on social media, e.g. through the utilization of avatars (see Bekci in chapter 14) or greenscreen effects.

As the description and discussion of several app features has shown, social media might even have the potential to innovate feedback processes, e.g. through novel video feedback formats or a variety of quick reactions. To that end, this chapter has discussed various feedback possibilities based on the platforms Instagram, X (Twitter), TikTok, YouTube, and Facebook. The different features were classified into three groups: quick feedback reactions, video feedback options, and additional features that go beyond the previous two categories. Most of these social media platforms offer similar quick feedback reactions. However, Instagram provides some unique features such as the “emoji slider” function. Moreover, the Reels and Stories function of Instagram can be useful for the exchange of video feedback. YouTube, as one of the oldest and most popular video platforms, also offers its users a wide range of video feedback possibilities. TikTok, on the other hand, is one of the newest, yet currently the most influential social media tool that shapes the daily lives of millions of people. It offers many innovative features for feedback purposes, such as TikTok Duets and Remixes. X (Twitter), as a text-based social media app, offers complementary functions that can be utilized in the classroom. Facebook, one of the oldest examples of worldwide usage of social media, can evolve into a collaborative learning environment for feedback purposes and thus present an alternative to the use of learning management systems (e.g. when they are not available for an institution or learner group or when their feedback features are too limited). Apart from Facebook groups and Facebook pages, Facebook Live is another special feature of Facebook which is particularly suitable for synchronous feedback. In addition, since social media tools and platforms are constantly evolving, it can be assumed that further potentials can be exploited in the near future which are not yet foreseeable at present.

Given this plethora of possibilities and the dearth of empirical studies and pedagogical best practices, it is obvious that much work still needs to be done, requiring a fruitful dialogue between educators, researchers, and policy makers. The affordances and limitations of social media for feedback processes should be thoroughly explored, not only by collecting students’ and teachers’ opinions (as is mostly done), but by investigating “actual learning gains” (Niu, 2019, p. 1398, with reference to Seymour, Wiese, & Hunter, 2000). While pedagogical interest in the use of social media is growing, not the least due to their popularity among students (Perez et al., 2023, pp. 2, 19), this alone is not a sufficient reason for their implementation in teaching. There must be an “intentional pedagogical design” and ideally empirical evidence to justify their “[m]eaningful uses for teaching” (Lin et al., 2013, p. 44; see also chapter 4 by Schluer on pedagogical design). A starting point for this might be innovative practices that teachers have tried out in their teaching and that seem to have the potential to evolve into best practices which they would like to share with their colleagues. Typically, these best practices will be situated in specific learning environments, with different learning goals and tasks. To some extent, they might, however, have high potential for transfer to other teaching contexts across different disciplines (see also the transdisciplinary transfer project by Schluer & Meier, 2024). To exemplify, feedback features that turned out to be useful for commenting on early stages of idea generation vs. later phases of (almost finalized) multimedia projects might be applicable across disciplines. Nevertheless, this needs to be tried out and proven before any definite claims can be made.

Finally, it should be noted that social media features should not be considered as a replacement for other feedback mechanisms, but rather be seen as part of a more complex pedagogical design that is tailored to the needs of a specific learning environment and the outcomes that are to be reached. Especially when embedded in a co-design space between learners and teachers (cf. chapter 3 by Liu in this volume), social media could give rise to novel explorations that might ultimately enhance feedback processes. For this, both student and teacher feedback literacies need to be fostered and co-developed continuously (e.g. Schluer et al., 2023).

7. Conclusion

In conclusion, social media offer a wide range of possibilities for feedback processes both synchronously and asynchronously. The social media functions might ultimately innovate and inspire established feedback formats, such as video feedback. They could be used to expand the feedback features of protected learning platforms of schools and universities. Moreover, teachers and learners can practice their use by resorting to fake messengers that merely imitate the interface of social media. They offer a safe platform to try out the feedback functions of social media without having to create an account on a real social media app.

This chapter paves the way for future research on feedback on social media, not only as it provides a comprehensive overview of feedback features afforded by popular social media platforms, but also because there are many more platforms and functions to be explored. Examples include Reddit as well as various messenger apps that continuously grow in their scope of functions, such as WhatsApp and Telegram.

In this ever-evolving digital space, new feedback options arise over time which should be examined critically regarding their pedagogical usefulness. Notably, the ongoing developments in the field of artificial intelligence might facilitate the feedback process in certain ways, but require a critical and conscious use (see also chapters 16 and 17 by Schluer in this volume). Considerable limitations and potential problems also concern data protection and the distractive functions of social media. In future research and teaching practice, it is therefore essential to dive deeper and discover which social media apps and which features are the most suitable for what learner group, proficiency level, age, sociocultural context, language level, etc. Future studies should also focus on these issues to provide methods to minimize the limitations of social media and to maximize their efficiency for feedback purposes. Teachers, researchers, and policy makers are therefore invited to engage in dialogue about a student-centered use of novel feedback tools.

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Voiceover Feedback on TikTok

Erhan Altay

Abstract *In today's digital era, technology has revolutionized education and has provided new opportunities for learners to enhance their language learning experience. Learning a language does not have to be boring, and with the advancements in technology, the possibilities for interactive and engaging activities are limitless. The use of video applications has made video editing more accessible and user-friendly, allowing learners to create their own content with ease. One such popular platform is TikTok, which provides users with a vast array of tools to create content and share it with others. Moreover, video editing possibilities can be used for feedback purposes. For instance, learners can leave an audio comment by using the voice-over function of TikTok. In the teaching idea presented in this chapter, learners are asked to produce a video on TikTok, for instance a recorded slideshow presentation. Afterwards, learners will give digital audio feedback to each other. In this way, learners will easily be able to provide digital audio feedback to each other. Moreover, the integration of social media has the possibility to enhance student interaction and learning beyond the classroom. Overall, incorporating digital platforms like TikTok into language learning activities can help learners to stay engaged and motivated while developing essential language skills. This approach can provide a fun and interactive way to learn a language while also building technical skills that can be beneficial in the future.*

Keywords *TikTok; video feedback; audio feedback; voiceover feedback; language learning*

1. Introduction

In today's digital era, technology has revolutionized education and has provided new opportunities for learners to enhance their language learning experience. Especially digital media have changed the daily lives of people completely. Notably, there are many social media platforms that shape the way people live, dress, talk and behave. After the breakout of the pandemic in 2019, digitalization in education became inevitable. Particularly in this era, the importance of the implementation of social media in language education increased because it was an essential place for learners to get exposed to authentic language input, as travelling became almost impossible due to the lockdowns. In 2023, almost all restrictions of the pandemic were lifted in every country. However, as digitalization in

language education proved to be efficient in many aspects, it should be continued after the pandemic as well.

In this paper, I will try to give a brief explanation of a teaching idea which serves as an example of digital language learning. TikTok is one of the most influential social media platforms today (Duan, 2023). It has a huge impact on millions of people, especially on the younger generations. Thus, I believe that the usage of TikTok in language learning is essential to increase young EFL learners' interest and motivation. One of the many ways to include TikTok in the process of language teaching is voiceover feedback, which will be focused on in this paper. In the following parts, I will therefore give a more detailed explanation of voiceover feedback on TikTok.

2. Literature Review

In the literature about digitalized education, language teaching via social media played an important role. Even though there is still a huge research gap in this field, previous studies tried to identify student perceptions of implementing social media into language learning. Moreover, some studies tried to find out the effects of social media in language teaching through qualitative research methods in which they try out the different functions of social media in a physical or online classroom.

Duan (2023) aimed to discover the possible implementation of TikTok as a new way of English language learning and gives an exhaustive explanation of TikTok as an educational tool. Zhen et al. (2022) tried to explore the effects of a Duet challenge on TikTok on the improvement of ESL learners' speaking skills. Post-test results showed that most of the students not only improved their speaking skills, but also displayed improvement in additional skills, such as vocabulary, grammar etc., as the TikTok challenge activity provided an authentic language atmosphere to practice their English skills.

Moreover, Anumathan and Hashim (2022) focused on the impact of TikTok on the acquisition of English vocabulary by collecting qualitative and quantitative data from 45 primary school students in Malaysia. In their research, they included a pre-test, a post-test, and additionally interviewed 10 students. Based on their findings, Anumathan and Hashim (2022) suggested that TikTok could be integrated for educational purposes as it encourages students and triggers a socially collaborative learning atmosphere. Bernard (2021), similarly to Anumathan and Hashim (2022), tried to assess TikTok's effect on vocabulary acquisition. In this study, students watched, selected and filtered videos on TikTok. The analysis of focus group interviews with eight college students showed that their motivation increased. Moreover, the vocabulary of the students improved.

Herlisya and Wiratno (2022) conducted a descriptive quantitative study using classroom action research techniques in Indonesia with 20 university students. Based on their findings, Herlisya and Wiratno (2022) concluded that TikTok is a suitable way to improve students' speaking performance. They also pointed out that incorporating TikTok in an EFL classroom makes it easier for students to acquire new vocabulary in English and consequently students might find it more fun to use TikTok for educational purposes.

Based on the results of the previously mentioned studies, it can be said that the implementation of TikTok in an English as Foreign Language classroom can be an effective

method to increase students' motivation and interest. Moreover, via TikTok students can improve different abilities such as speaking and vocabulary. With a countless number of authentic contents, TikTok can provide learners with good learning experiences that cannot be found in a traditional learning atmosphere.

3. Language Learning on TikTok

TikTok is one of the most popular and influential social media tools nowadays. It has 1.7 billion monthly active users and has been downloaded more than three billion times (Iqbal, 2023). It can be categorized as a short video platform. With its countless unique features, TikTok has been shaping the daily lives of millions of people and setting the trends for the past few years. It offers many functions, such as Duet, Stitch, or Green-screen features, for its users. Its interface is quite user-friendly, which means that an ordinary user of social media can produce content, create, and edit videos without much difficulty. TikTok makes video editing quite easy and ordinary even though video editing had been a mystery for the majority of people before the release of TikTok or similar platforms on mobile devices.

With these functions, TikTok can also be said to be a learner-friendly platform. Some EFL learners have been using TikTok for language learning purposes both consciously and unconsciously. On TikTok, there are several content creators who aim to teach English via videos. However, TikTok can improve learners' English skills even without specifically designed educational videos as it includes millions of authentic contents from native speakers or proficient users of English. EFL learners can access authentic contents to learn and comprehend the daily conversations from different contexts. This kind of language learning interaction on TikTok can be considered as some kind of informal or 'passive' learning in which EFL learners improve their language skills passively by watching, listening, and reading authentic content in the target language. However, learners can also participate in language learning on TikTok as active agents. In the following part, I will explain how learners can learn and practice their language skills actively on TikTok.

4. Voiceover Feedback on TikTok

TikTok offers numerous video features so that there are several ways to produce and edit videos on TikTok. Students, under the guidance of lecturers, can be asked to produce course-related content on TikTok. For instance, with the slide feature of TikTok, students upload their recorded presentations about a topic onto TikTok. Alternatively, they can produce roleplay videos to activate the gamified elements in language learning, e.g. by acting as an interviewer and a famous football player giving an interview. This way, they can produce content to practice their language skills on TikTok actively.

Another important point is that students should also be encouraged to use TikTok for peer feedback purposes. In that respect, students can leave feedback to each other by using the video features of TikTok. Some of these video features, such as TikTok Duet

and Stitch, are suitable for feedback purposes. Via TikTok's Duet feature, students can shoot their feedback videos alongside with the original video of the peer. TikTok Stitch, in turn, allows them to select a small part of their peer's video and record their feedback video that will play after the peer's original video.

The main focus of this paper is the voiceover feedback on TikTok. Learners can download their peers' videos and save them to their galleries. After doing so, they can upload the original video on which they want to give feedback and start editing it. The voiceover feature allows users to remove and turn down the original sound of the video. Afterwards, the students can add additional background music as they wish according to their creativities and by bearing copyright in mind. Moreover, TikTok allows users to record their voice at any point of the original video. Thus, this function of TikTok can be utilized as screencast video feedback in which learners leave audio feedback to each other whilst scrolling through their peers' original videos (cf. Schluer, 2022, p. 186). Screencast can be simply described as the recording of digital screen, and it is an effective way of utilizing peer feedback (see the review by Schluer, 2022, pp. 185–207). On TikTok, for instance, students can record their screen while showing their writings, essays, or presentations, and ask for feedback on specific points. The second person can use the voiceover feature of TikTok to create screencast video feedback on TikTok. By doing so, students will be using TikTok both actively and passively to produce content and receive feedback from their peers. Throughout this process, the teachers should act as guides to monitor and maximize TikTok's efficiency on learners' improvement. Based on Duan's (2023) ideas, mobile phones can be used as a mini classroom to enact this learning idea.

However, possible disadvantages of using TikTok should also be considered. Distractive features of TikTok and sensitive content of the platform should be regarded while implementing it as an educational tool in EFL. Moreover, digital literacy should be acquired by both learners and educators to maximize its advantages and minimize its disadvantages. Moreover, learners should also have access to the necessary digital equipment and connection.

5. Conclusion

TikTok, as one of the world's most influential social media tools shapes people's daily lives. It offers a countless number of features that can be used for educational purposes. On TikTok, learners can improve their language skills both actively and passively. Passive learning on TikTok has already been frequently performed by many students. However, using TikTok for English language study requires developing active learning skills on the platform. This paper has argued that video feedback on TikTok is a possible method to use mobile phones as a mini classroom in which students can learn, collaborate, and improve themselves beyond the classroom.

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Adapting Social Media to English Language Teaching: 'Dialogue on Instagram Story'

Ezgi Irem Bekci

Abstract *The social media use in language learning has become increasingly popular due to its potential to increase learners' motivation and engagement in English classroom activities (Ali et al., 2020). The present chapter focuses on the use of Instagram as a tool to enhance learners' vocabulary in a collaborative peer work environment by using social media for educational purposes. During the activity, students work in pairs to create avatars and write a small dialogue for their avatars. The pairs post their avatars and dialogues on Instagram story and use the direct message function to provide feedback. This activity aligns with key theoretical and methodological principles, such as MALL principles (Stockwell & Hubbard, 2013), cognitive load theory (Mayer, 2005, cited in Fageeh, 2013), constructivism (Sherif, 2015), learner-centered teaching, collaborative learning (Ali et. al., 2020) and authenticity in language learning (Hwang, 2005). By using avatars and creating short dialogues on Instagram story, learners are encouraged to use the vocabulary of the session and engage in peer-feedback through the direct message function of Instagram. Additionally, learners can develop their formative assessment skills by providing feedback, which will make them active learners. Moreover, teachers can use this activity to evaluate students' use of vocabulary and provide feedback accordingly. Overall, this chapter contributes to the ongoing discussion of the potential of social media in language learning.*

Keywords *social media; Instagram; vocabulary learning; peer feedback; language learning*

1. Introduction

The popularity of digital tools and social media platforms in daily life and their spread to educational settings changed traditional learning and teaching methods into new and contemporary learning approaches. These often have positive outcomes. Using social media in language learning has become popular because it has the potential to increase learners' motivation and engagement in English classroom activities (Ali et al., 2020). Based on the positive impact that social media have on effective learning (Arif, 2019) and learners' engagement, I designed a classroom activity that can be used in ESL and/or EFL

settings. The activity aims to contribute to the research on using Instagram in English language learning settings in a collaborative way to improve vocabulary acquisition. In the activity, pairs work collaboratively to create avatars on an online platform and write small dialogues for their avatars. Following this, they post their avatars and dialogues on Instagram and use the direct message function to provide feedback. Among the key theoretical and methodological principles that the activity aligns with are MALL principles (Stockwell & Hubbard, 2013), cognitive load theory (Mayer, 2005, cited by Fageeh, 2013), constructivism (Sherif, 2015), learner-centered approach, collaborative learning (Ali et al., 2020) and authenticity (Hwang, 2005). Additionally, learners can develop their formative assessment skills by providing feedback, making them active learners. Moreover, teachers can use this activity to evaluate students' use of vocabulary and provide feedback accordingly.

2. Literature Review

With the advancement of technology, educational techniques and methods stepped into a new era. Technological devices and the internet have become indispensable parts of the classroom. Internet channels and websites created for educational purposes help teachers to educate students in innovative ways. Among these, social media is the most popular tool nowadays. The potential of social media to improve English skills has been studied and discussed by many researchers and it has had mainly positive impacts so far. Arif (2019), for instance, states that social media provide opportunities to improve students' English language skills because the language used in social media is mostly English and it is used all over the world to communicate. Arif addresses an important point, i.e., that English is the most common language in social media channels, and therefore its potential to help people learn English naturally and unconsciously is very high. Additionally, teachers and students also use social media consciously to learn English. For instance, Li (2017) suggests in her article that students liked using social media for their English courses and even kept using the Facebook page after graduation to communicate and practice English. Moreover, Li's students reacted very positively while using social media in a constructive way in the classroom because they had an attachment to their phones as she implies (Li, 2017).

Using social media in the classroom has many advantages, especially for language learning. First of all, Ali et al. (2020) suggested in their article that one of the most important aspects of social media in the classroom is its easiness to use and adapt as it does not require practical concepts or proper training for learning methods. It made a huge change in the learning and teaching process as it helped students learn effectively and innovatively while engaging them more and more (Ali et al., 2020). This helps create a learner-centered teaching atmosphere in language learning settings. In most traditional learning and teaching settings, the teacher has occupied the dominant role with a focus on delivering lectures and explaining concepts (Ali et al., 2020). However, using mobile phones and social media can make learners active agents of their own learning processes. Additionally, in Arif's (2019) study, findings indicated that motivation, improvement, and effectiveness were among the main advantages of using social media in

learning environments. It is further suggested that the use of social media improves students' motivation through student-centered learning, it develops language skills such as reading, speaking, vocabulary, etc. and lastly, it makes learning more effective. Overall, using social media for educational purposes has had positive effects so far.

3. Theoretical and Methodological Principles

Over the years, teaching and learning methods have changed and been developed along with technology. The latest phenomenon in English teaching is using social media. Li (2017) suggests that in English language teaching, the use of social media has evolved over the years (p. 148). Most importantly, it has positive impacts. Based on this, I designed an English learning activity for ESL and/or EFL classes. This activity aligns with the following theoretical and methodological principles.

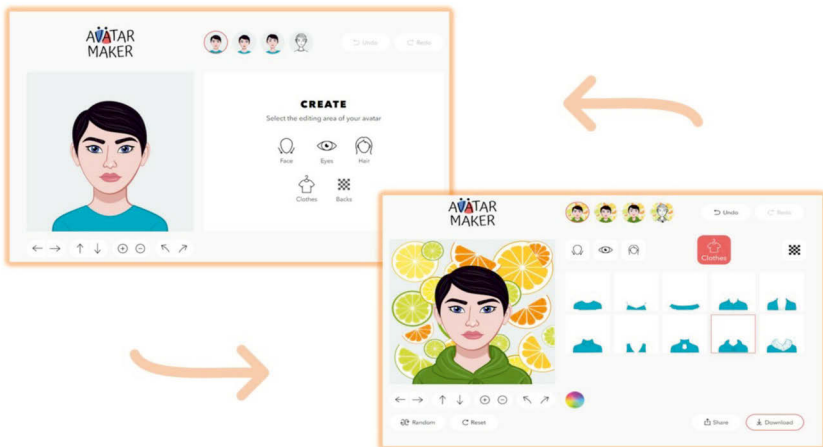
- (1) Cognitive load theory: The activity, firstly, aligns with cognitive load theory. The theory implies that the learning material should be designed to minimize the learners' cognitive load during the learning process (Mayer, 2005, as cited in Fageeh, 2013). This activity is designed to avoid overwhelming learners' working memory. The aim is to improve vocabulary acquisition in a way that learners can enjoy the process without feeling overwhelmed.
- (2) Constructivism: The role of the teachers in constructivist theory is to act as facilitators who develop materials to help learners acquire language skills properly. Additionally, constructivism fosters learners to be in charge of their own learning (Sherif, 2015). In this activity, learners are able to participate and learn on their own. The role of the instructor is to provide information regarding media use, and how to complete the task. Apart from that, the learners are free to engage and perform as they wish.
- (3) MALL principles: In terms of using technology in the activity, the activity benefits from the ten principles that serve as the initial basis for developing and implementing mobile language learning (Stockwell & Hubbard, 2013). For example, based on principle 8, which aims to let the language learning task fit the technology and environment and let technology and environment fit the task (Stockwell & Hubbard, 2013), I have prepared a task that is relevant to the topic of the session and the social media that are used.
- (4) Learner-centered approach: Most importantly, this activity is designed in a way that learners are the active agents of the learning process. The inclusion of technology in the classroom changes teacher-focused learning into learner-focused (Ali et al., 2020). In designing this activity, I followed this approach and considered the needs, preferences, and interests of learners.
- (5) Authenticity: Once students are hooked on authentic materials, which trigger the process of natural language acquisition, effective EFL education can be realized (Hwang, 2005). In order to help students learn English through everyday and real-world language, teaching benefits from a topic that learners encounter every day. Additionally, in this activity, learners gain knowledge about social media use for education.

- (6) Collaborative learning: Faggeh (2013) suggests in his article that collaboration among students is important for enhancing vocabulary. In the collaborative activity described below, learners participate, discuss, and interact with their peers.

4. Activity Description and Discussion

The title of the activity is “Dialogue on Instagram Story”. It is a follow-up activity after a vocabulary learning task and it aims to foster students’ creativity in a foreign language and help learners use social media (Instagram) for educational purposes, such as language learning. Throughout the activity, students have the chance to repeat and learn the vocabulary of the session. It is a peer activity designed for high-school learners with A2-B1 language proficiency. Moreover, the number of students in this activity is planned to be 10 to 12. It is intended for face-to-face settings; however, it can be conducted in online and/or blended settings as well. To complete this activity, students need Instagram accounts which are created before the activity, as well as a mobile device to use Instagram. It is important that students create separate accounts from their private accounts for data protection reasons. Additionally, each student should follow the teacher’s account as well as their class members in order to be able to see the content that is posted on Instagram (see chapter 12 by Schluer on social media feedback in this volume). Other than that, the students will benefit from the materials from the previous vocabulary activity (on Padlet) that was conducted in that same session.

Figure 1: Sample Features of the Avatar Maker



To complete the activity, students work in pairs. They create an avatar using an avatar-making website (<https://avatarmaker.com/>) (see Figure 1). Additionally, they will write a dialogue for their avatars using the vocabulary that they learned in the previous session. Avatars are better options than real pictures for this task in terms of

data protection. The avatar-making website offers different features to create avatars; however, students can also use the features of Instagram to create their avatars. Lastly, they will share their avatars and dialogues on Instagram. While posting their stories on Instagram, students should pay attention to the following aspects:

- (1) For each sentence of the dialogue, there should be one separate story (see Figure 2).
- (2) The stories should be posted in the order that the users can read the dialogue properly.
- (3) They can use different features of the Instagram story and add stickers, emojis, background pictures, etc.

Figure 2: Use of Avatars on Instagram Stories



At the end of this activity, students will use the Instagram Direct Message function to provide peer feedback. Moreover, the teacher can evaluate the outcomes of the activity with a pre- and post-test. The teacher can also give feedback on learners' performance while using the vocabulary in different contexts and provide further feedback if necessary.

The possible challenges during the activity can be technical problems related to the internet connection, electricity, etc. These problems can be addressed easily by rescheduling the activity. Another challenge could be the learners losing their interest. In that case, the teacher should take the learners' interests and preferences into consideration and replace the activity with another one. The last challenge I want to state is that social media is full of distractive content and thus, learners' attention could be distracted while using Instagram. Li (2017) also suggests in her article that social media can be distractive, and teachers should therefore be careful. She is also conscious of not overusing different social media during a class, using it at most twice during a 3-hour class (Li, 2017). To prevent the problem, teachers should be very mindful about the time spent using social media and guide learners to use it effectively.

5. Conclusion

The positive outcomes of using social media in English language learning settings are one of the latest phenomena in English teaching and they have been discussed by several researchers so far (Ali et al., 2020; Arif, 2019; Li, 2017). I designed a classroom activity in which learners can use social media to learn and practice English in and outside the classroom while engaging in a collaborative peer activity. The main goals of the activity have already been discussed above. However, the aim of this activity goes far beyond the already mentioned goals, reaching a deeper point. At the end of this activity, learners will be able to use social media with a wider perspective other than just entertainment. To conclude, I must mention that this activity has not been tested yet. The teachers who want to implement the activity in their own classrooms should take the following points into consideration. First, they should adapt the activity according to their learners' needs. The aim of the activity is to help enhance vocabulary; however, teachers can use such an activity to improve grammar, reading, speaking, etc. Secondly, they should inform learners about using social media properly when engaging in a classroom activity. They can prepare guidelines for the specific usage of social media beforehand. Lastly, they should pay attention to the time spent during the activity to prevent distractions that may stem from other social media contents.

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Feedback on Study Time and Distraction-Free Learning Environment

Manuel Schmitz, Jenny Rettstatt, Markus Suren, Daniel Brand, Martina Seemann, Marco Ragni, Günter Daniel Rey

Abstract *Creating a distraction-free learning environment and maintaining focus over time is a significant challenge for many learners. Challenges can arise from the distracting effects of various social media services (e.g., Instagram, TikTok, Facebook) and from deficits in time management and goal planning. In our study, we aimed to minimize these distractions and improve time management and goal planning with different interventions. We wanted to create an optimal learning environment adapted to the user's personality profile. Therefore, we compared three interventions, one for distraction blocking (Freedom) and two for time management and goal setting (SuperProductivity & the S.M.A.R.T.-Technique). We also collected the personality profiles of the participants using the Need for Cognition Test (NFC), the Cognitive Reflection Task (CRT), and the Motivated Strategies for Learning Questionnaire (MSLQ). Based on these profiles, the goal was to build a system that recommends the most suitable intervention for a person with a particular personality trait. There is evidence in the literature that time management and distraction-free environments (with the help of apps) are beneficial to learning, but in our study the use of the SuperProductivity and Freedom apps was minimal.*

Keywords *automated feedback; time management; distraction blocking; motivation; metacognitive strategies*

1. Introduction

Self-regulated Learning (SLR) poses numerous difficulties. According to Butler and Winne (1995), SRL is a multifaceted framework that integrates motivational, cognitive, and behavioral elements. It involves setting goals and employing strategies to achieve them while also receiving internal feedback. Learners could adjust or abandon their goals as necessary based on monitoring progress, costs vs. benefits assessment, and various personal factors that influence cognitive and motivational processes. Overall, both internal and external feedback are vital in goal setting as well as in pursuing personal

goals. In this chapter, we want to discuss two challenges in the greater context of self-regulated learning, i.e. time management and distraction-free learning environment, and point out how automated feedback could support both strategies. There is evidence to believe that this could have a positive impact on learning in terms of motivational and metacognitive factors, as well as performance in assessments.

2. Literature Review

2.1. Time Management

The Pomodoro technique attributed to F. Cirillo (2006) is one example of a time management method that involves breaking work into focused intervals, traditionally 25 minutes long, and separated by short breaks. After completing four “Pomodoros,” or work intervals, a more extended break is taken. This technique aims to enhance productivity and maintain concentration. The Pomodoro technique is effective because it promotes the idea that sustained, focused effort can enhance productivity and reduce procrastination. It also helps individuals become more aware of how they spend their time and make better decisions about task prioritization. This method can be adapted to various work styles, and there are numerous Pomodoro apps and timers available to help people implement the technique.

There has been a call for teaching time management at universities (van der Meer et al., 2010). For example, Häfner et al. (2014) introduced a training program for time management based on the findings by Latham and Locke (1972), Shelley et al. (1998) and Gollwitzer and Brandstätter (1997). Time management can be seen as a means of successful adaptation, which is associated with well-being, retention, and performance. Techniques used to foster time management are goal setting, mental simulation, and implementation intentions. The training therefore consisted of prioritizing and goal setting (Latham & Locke, 1991), strategy development, and process simulation. Furthermore, it provided questions for reflection to help structure the workday. It was found that implementing intentions and monitoring them successfully moderated perceived stress and increased perceived time management.

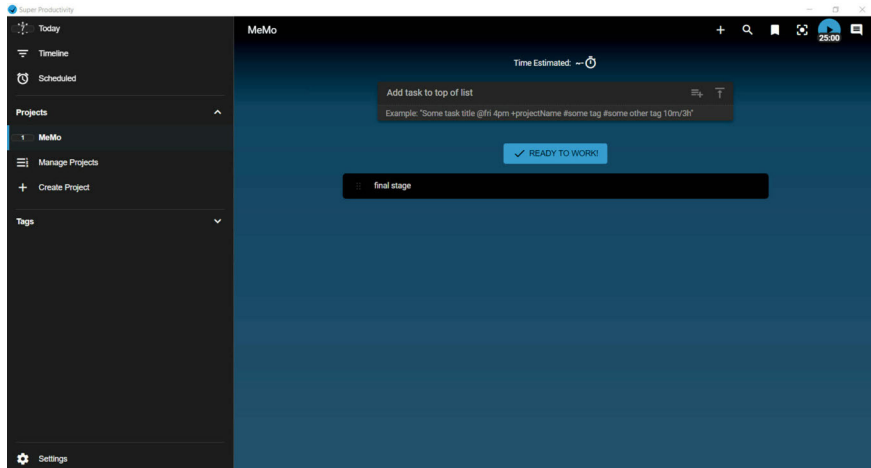
Bewicke et al. (2010) discovered that the first semester is particularly stressful for students. Consequently, the study by Häfner et al. (2014) found that effective time management was particularly beneficial at the start of the first semester. Following a two-hour training, participants experienced a significant decrease in perceived stress and an increase in their sense of control over time. In another experiment by van Eerde (2003), participants reported significantly lower avoidance behaviors, such as procrastination, compared with a control group one month after visiting a time management training.

While Butler and Winne (1995) emphasize goal setting as an integral part of self-regulated learning, Hattie and Timperley (2007) elaborate on how feedback can be utilized to establish ambitious goals, monitor progress towards those goals, and adapt effort and strategy accordingly. The interconnection between time management, self-regulated learning, and feedback thus becomes evident.

2.2. SuperProductivity and the S.M.A.R.T.-Technique

As time management is highly important, several apps have been developed to facilitate it. One example of such an app is the software *SuperProductivity* (Figure 1).

Figure 1: *SuperProductivity* App Interface on Desktop



The app has several features that help with time management. For example, the Pomodoro timer enables users to start, stop, and interrupt Pomodoro intervals, and obtain visual feedback on the progression of the interval. Further features are the creation of projects and the assignment of tasks (to a created project). Tasks may be described in more detail by using attachments or written text. To this end, three reflection questions are asked to help elaborate on the different tasks.

Each project comes with an individual surface. One such surface is the “Today” view, which is an overview of the tasks for each day. Projects and tasks serve as to-do lists. Additional features include statistics on time spent on single projects during the day and for breaks, the planning of future tasks, and reminders before or when the chosen task is due. Another feature is a conversational agent, which comments on the time spent without activity and on long work periods. The conversational agent will also congratulate users after they “finish work” on the “Today” surface (*SuperProductivity*, n.d.). In summary, *SuperProductivity* could serve as a planning tool, which provides support in keeping a daily to-do list. It can track how much time has been spent on which projects. It could offer a comparison between time estimate and invested time, as well as reveal time wasters. With the description of tasks, *SuperProductivity* app may support the use of S.M.A.R.T. goals (Doran, 1981).

The S.M.A.R.T. acronym offers a meticulously structured method for goal setting, intended to enhance clarity, concentration, and feasibility. Its principles have broad relevance in personal growth, education, and other spheres. This framework prompts individuals and teams to articulate their objectives with greater precision, ensuring that each

goal is not only clearly defined but also grounded in practical expectations and strategic planning. The initials are used to denote the following concepts:

- S – Specific: Objectives should be explicitly outlined and focused to concentrate efforts.
- M – Measurable: A goal must include criteria for tracking progress towards achievement.
- A – Achievable: The objective must be realistic given the current abilities and resources.
- R – Relevant: Learning goals need to align with an individual's educational or career aspirations so that they contribute meaningfully towards overall objectives.
- T – Time-bound: Introducing deadlines or timeframes compels urgency and aids prioritization of learning tasks when striving toward achieving a particular aim.

2.3. Information and Communication Technology as a Source of Distractions

Information and Communication Technology (ICT) can cause distractions. However, why are small distractions by technology considered detrimental to learning? Several studies in the current literature have investigated this question. For example, workplace productivity can be lost when employees engage in “cyberloafing” behavior. Cyberloafing means using companies' internet for non-work-related purposes during working time (Lim, 2002). In a current literature review, laptops and smartphones have been discussed as detrimental influences in a classroom setting. Notably, multi-tasking with smartphones has been reported to be detrimental to learning, which seems to be particularly true for instant messengers (Dontre, 2021).

There is evidence that being distracted by ICT causes physical stress. Galluch et al. (2015) offer a framework for how task-unrelated activities caused by information and communication technologies are stressful to learners. The detrimental influence of distractions caused by ICT can be twofold: perceptual overload or perceptual conflict may occur. Perceptual overload is the impression of having too much work to do in a limited period. Deadlines or the duty to present results may cause a feeling of overload. Moreover, being interrupted (e.g., by messages) will exacerbate strain and the feeling of overload. When learners receive messages on their smartphones, this may present a perceptual conflict. Perceptual conflict refers to incompatible situational requirements: Learners could either continue their task (on-task activities) or read the received message, which has personal relevance. Neither of them is compatible with the other. While some distractions cannot be avoided (e.g., mind-wandering caused by memories/experiences), measures can be taken to reduce distractions caused by ICT. Distraction-blocking apps are one such approach, as discussed in the following.

2.4. Distraction-Blocking Apps

Distraction-blocking apps suppress messages, notifications, apps, and websites that are considered as distractions by the user. Several applications exist which include distraction blocking as a service, e.g., *Freedom*, *Time Warp*, *Focus Writer*, *Self-Control*, *Off the Grid*, and *Cold Turkey*¹. Since distraction blocking can be a means to promote focused work, its application through apps has raised the interest of researchers. For example, in a study by Mark et al. (2017), information workers tried distraction blocking for two weeks (after one week of baseline working conditions) in an experimental setting. The experiment showed mixed results. The authors identified set intervals instead of user-controlled intervals as a disadvantage of distraction-blocking. Users may get a feeling of coercion or be forced to work but may also find healthy habits for taking breaks.

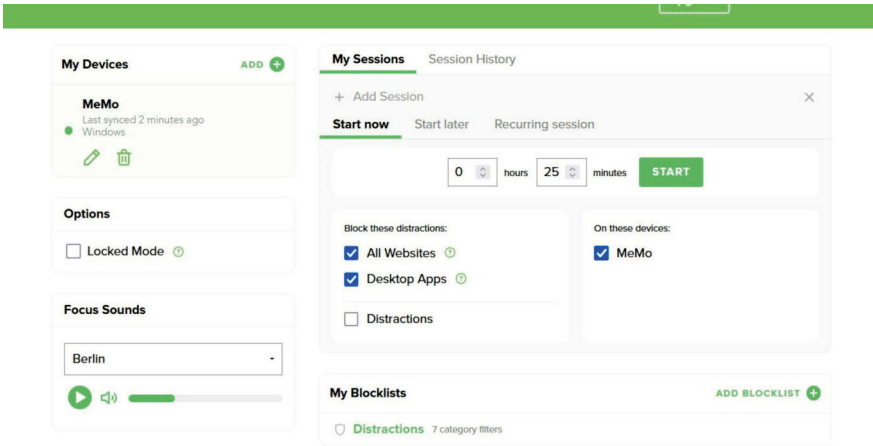
Instead of blocking websites, Kim et al. (2017) tried making *PomodoroLock* available to their sample. *PomodoroLock* is a technology that lets users voluntarily set a timer for focused work. They concluded that behavioral restriction can positively assist users in achieving their goals. The app *UpTime*, developed by Tseng et al. (2019), successfully tried to overcome prolonged pauses as a prime cause of cyberloafing behavior and a loss of productivity. To put the app to the test, a sample of IT workers was collected. They used either the *PomodoroLock* app, the *UpTime* app, or no app to help with distraction blocking. Automatic distraction-blocking intervals and negotiating access to blocked websites with a chatbot increased the users' acceptance of the distraction-blocking measures. *UpTime* was compared to *PomodoroLock* in the same study by Tsen et al. (2019) and led to better results: Participants felt less stress, maintained a sense of control, and were less susceptible to prolonged pauses.

In summary, extensive research (e.g., Kim et al., 2017; Mark et al., 2017; Tseng et al., 2019) has been carried out on the topic of minimizing distractions to enhance focused work, including the use of distraction blocking apps. While these methods can lead to improved productivity and reduced interruptions by curbing cyberloafing, they also have drawbacks such as diminished autonomy and trust issues, as well as heightened stress levels. One potential solution lies in promoting voluntary usage and employing innovative approaches like conversational agents (chatbots). Providing automated feedback during distracting activities and prompting individuals to explain their actions are found to be equally effective in reducing cyberloafing compared to enforcing strict rules.

For this study, we use the app *Freedom* (Freedom, 2011), which is like *UpTime*. The app allows users to block websites, apps, or the entire internet for the elimination of distraction (Figure 2). A session can be started on the fly, or a future session can be scheduled. Furthermore, there is a Lock Mode, which enables the user to end the *Freedom* session in advance.

1 See the following website: <https://www.makeuseof.com/apps-extensions-to-avoid-distraction/>

Figure 2: Freedom App Interface on Desktop



2.5. Connecting Feedback with Distraction Blocking, Goal Setting, and Time Management

Digital feedback is a growing field (Schluer, 2022) and has become a common practice in many areas of life. For example, human feedback, e.g. in the comments on OneDrive, and automated feedback, e.g. in Microsoft Office and Grammarly, have been used to write this paper.

Hattie and Timperley (2007, p. 82) provide a theoretical framework for feedback processes in a wider context. Feedback aims to fill a gap between what is understood and what is aimed to be understood. For this purpose, feedback must provide information about the task or process. Feedback is information that helps learners confirm, add to, overwrite, tune, or restructure information in memory. This information can be domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies (Hattie & Timperley, 2007, p. 82). Before feedback is given, goals should be clear. Good feedback should be able to define which goals are set (feed-up), how much progress has been made in achieving them (feed-back), and how this progress can be improved upon (feed-forward)². Feedback can be given by experts, teachers but also by learners or technologies. Time management apps and distraction-blocking apps may support some feedback targeted at self-regulation (Hattie & Timperley, 2007), which will be discussed in depth in the following paragraphs. Additionally, feedback is connected to goal setting and goal setting theory (Latham & Locke, 1991), which is connected to time management (Häfner et al., 2014).

How can apps support learners with time management by giving feedback? The *SuperProductivity* app, as an example, can provide feedback directed at the self-regulation level (Hattie & Timperley, 2007). This means directing self-monitoring and regulating consequent actions. There are a few limitations to the *SuperProductivity* app as a tool to

2 Three questions, "Where am I going", "How am I going?" and "Where to next?", have been used to describe feed-up, feed-back, feed-forward by Hattie and Timperley (2007).

provide feedback. When using *SuperProductivity*, participants can define their goals, such as a few Pomodoro intervals, but they need to do it themselves. *SuperProductivity* can neither provide feed-up, meaning success criteria, nor feed-forward, i.e. strategies to improve after feedback was given. When evaluating their performance against established criteria, such as devoting one hour to focused learning every Monday, learners need to determine their next steps. Should their performance fall short of the standards set, it is the responsibility of the learners to discern the consequences. However, participants must depend on their dedication for effective implementation. Unless learners are prepared to utilize automated feedback, it will be ineffective (Hattie & Timperley, 2007).

According to Latham and Locke (1991), feedback supports goal setting. After learners receive feedback, they can define more ambitious goals. This could also work for time management if their current performance does not equal the goal chosen by a learner. For example, the goal could be to read a scientific paper for two hours every Friday. However, the learners might need more than two hours for the reading, or they may not succeed in establishing a regular pattern of reading every Friday. In those cases, feedback by productivity apps can help in noticing how much time was needed for the reading and how often the goal of reading every Friday was met. Consequently, time could be saved or learning patterns improved, given that the learner commits to it. It may be easier to improve time management through automated feedback because the tracking time and progress is collected without effort for the learner by a technical device (as is given for example by *SuperProductivity*). This contrasts with interventions in which in-process data are collected more intrusively, thus potentially interfering with the actual task completion process. Hence, a technology-supported means of improving time management could be very useful for students. An open question, however, is whether feedback is connected to distraction-blocking applications. The app *Freedom* claims to be helpful if social media and notifications are distracting (Freedom, 2011), but it could also help by providing feedback on how long one has spent learning in distraction-free mode.

2.6. SuperProductivity and Freedom as Training

According to Galluch et al. (2015, p. 9), “acknowledging the option to become less active and relax from work stressors” is helpful in situations of perceptual overload when there is no perceptual conflict. In that regard, Pomodoro intervals could be a way to avoid perceptual conflict. Pomodoro interval is a feature both *SuperProductivity* (SuperProductivity, n.d.) and *Freedom* (Freedom, 2011) have. In this way, they may support the learning process. It is also possible that *Freedom* and *SuperProductivity* apps have a combined influence on learning. Kim et al. (2017) noted that *Freedom* lacked a systematic way of time management, so maybe combining *Freedom* and *SuperProductivity* could be an improvement. Since distractions present a problem when learning in a classroom setting, distraction-blocking apps may help to reduce perceptual conflict or perceptual overload. So far, however, they have only been researched in workplace settings. In this study, we therefore want to investigate whether distraction-blocking apps could be just as helpful to students. Will a distraction-blocking app improve metacognition, motivation, and performance?

Above, we have also explained that time management is an important metacognitive strategy. Two hours of time management training can improve time management

(Häfner et al., 2014). Moreover, the *SuperProductivity* app has various features that may improve time management, e.g., automated feedback, but the potential influence of apps on time management has not been researched to our knowledge. In this study, we thus want to examine whether time management could be improved just as effectively by an app as through training. Will a chosen time management app improve metacognition, motivation, and performance? We assume that a training consisting of either a distraction-blocking app (*Freedom*, *SuperProductivity*) or both combined will have measurable effects on metacognition, motivation, and performance in quizzes about the subject matter. Therefore, the following research question is raised:

Research question 1: Were the training designs effective overall?

We hypothesize that the

- Training conditions (*Freedom*, *SuperProductivity*, *Use of both*) will improve performance more in the experimental group than in a control group when comparing pre-training with post-training.
- Training conditions (*Freedom*, *SuperProductivity*, *Use of both*) will lead to higher motivation in the experimental group than in a control group when comparing pre-training with post-training.
- Training conditions (*Freedom*, *SuperProductivity*, *Use of both*) will result in better metacognitive strategies in the experimental group than in a control group when comparing pre-training with post-training.

2.7. Neighborhood-Based Collaborative Filtering

A central issue for educational and differential psychologists has been the prediction of academic achievement (Blickle, 1996; Buasato et al., 2000). This challenge has motivated the development of psychometric assessments of intelligence, specifically cognitive ability tests. Chamorro-Premuzic and Furnham (2003) conducted a study examining the relationship between personality traits and academic performance (AP) in two groups of British university students. The results of the research suggested a significant relationship between personality assessments administered at the beginning of the academic year and final scores on end-of-term exams. In this study, we want to predict the AP with a neighborhood-based collaborative filtering algorithm (e.g., memory-based algorithms), specifically a user-based collaborative filtering. Here the recommendations for a target user, A, are generated by considering the ratings given by users who are similar to A. The expected ratings for user A are determined by calculating the weighted average of these ratings from the “peer group” for each item (Aggarwal, 2016). Therefore, the following research questions are posed:

Research question 2: Were the design variations appropriate for the different heterogeneous student groups?

- Will a recommender system be able to cluster heterogeneous student groups?
- Is it possible to recommend an intervention based on the personality profile?

3. Methodology

3.1. Sample

In February 2023, a pre-study was conducted at Chemnitz University of Technology in one course (Python programming) in the winter semester 2022/2023. 14 students participated in the experiment, but three cases had to be excluded because data were missing.

The main study was conducted at Chemnitz University of Technology in five cooperating Bachelor's (Teaching and Learning with Media I, Teaching and Learning with Media II, Teaching and Learning with Media) and Master's courses (Interactive Learning Media II, Transport and Mobility) in the summer semester of 2023. Need for Cognition and Cognitive Reflection Task were used to measure heterogeneity. In total, data were collected at three points in time (May, June, July). At the first measurement point, 97 students took part in the study, but there was a very high drop-out rate, with only 17 students completing the entire study.

3.2. Design

The design was two-factorial, two-step (between-subjects) and three-step (within-subjects) $2 \times 2 \times 3$ (Pre-Test, Post-Test 1, Post-Test 2). The treatment consisted of apps to support time management (*SuperProductivity*), distraction-free learning (*Freedom*), or both metacognitive strategies (*Freedom* and *SuperProductivity*). Dependent variables were achievement in individual classes, motivation, and metacognition.

3.3. Scales, Measures, and Operationalization

To generate the recommendation system and distinguish cognitive variables for different personality types, the Need for Cognition Questionnaire (NFC-K; Bless et al., 1994; Beißert et al., 2015), the Cognitive Reflection Task (CRT) including extensions (Alós-Ferrer et al., 2016), and the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, 1991) were evaluated. The MSLQ includes test anxiety, expectancy components (e.g., control of learning beliefs, self-efficacy), resource management strategies (e.g., time and study environment, effort management), cognitive and metacognitive strategies (e.g., metacognitive self-regulation). The quizzes themselves were designed in a multiple-choice format with either four or five options. A point was awarded for both selecting the correct and for not selecting the incorrect answers. To make the quizzes comparable, the score was weighted by the number of questions and answer choices (see examples in Appendix I). The Technology Acceptance Model (TAM) was used for the pre-study (Ventakesh & Bala, 2008). All questions were asked in German.

3.4. Learning Material

In the preliminary stage, participants were given either a 5-minute tutorial on using the *SuperProductivity* app or an unrelated video of similar duration. The main study utilized different learning materials based on the course attended by participants to ensure com-

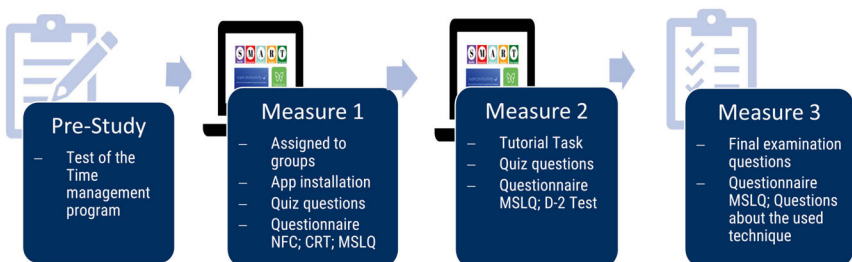
parability. Quizzes with 8–13 questions and 4–5 answer options – both correct and incorrect – were employed at each measurement point in all courses conducted from May to July as part of this evaluation. A univariate ANOVA revealed a significant difference in difficulty depending on classes/seminar for the third measurement point $F(3,13) = 3.45$, $p = .049$, Partial $\eta^2 = .44$. This may have been due to a small sample size ($N = 17$). It seems that participants were particularly successful in Teaching and Learning with Media II ($M = .78$, $SD = .09$) and less successful in Teaching and Learning with Media ($M = .57$, $SD = .09$) in the last measurement.

3.5. Procedure

For the initial study on *SuperProductivity*, a time management program was implemented in a classroom setting. Participants completed nine tasks designed to assess their use of *SuperProductivity* and their development of essential time management skills. Their usage and time spent on each task were then evaluated. Task accuracy was assessed by two independent raters. At the first assessment, participants were assigned to groups and provided with installation links for either *Superproductivity*, *Freedom*, or both programs based on their groups. An active control group received a PDF document outlining basic techniques to enhance metacognition. Additionally, all participants underwent a tutorial at the second evaluation point where they were briefly introduced to the utilized programs.

At each measurement point, we administered quiz questions related to the course lectures and collected responses to questionnaires. The first set of quiz questions tested the students' prior knowledge, and we gathered responses from the NFC-K, CRT, and MSLQ. In the second measurement point, quiz questions covered previous lecture contents, while we gathered MSLQ responses and conducted the D-2 test. The third measurement point consisted of a final review of all lecture content learned alongside another round of MSLQ questionnaires. Participants were asked additional questions about their use or non-use of *SuperProductivity* and *Freedom* (see Appendix II).

Figure 3: Schedule of the Specific Actions Carried Out in Winter Semester 2022/2023 (Pre-Study) and Summer Semester 2023 (Measures 1–3)



4. Findings

4.1. Results for the Pre-Test

An instructional video was tested as a tutorial for the time management application *SuperProductivity* ($N=11$). After watching the video tutorial, participants ($M=816.00$, $SD=161.01$) were able to solve tasks significantly faster ($t(9)=2.47$, $p=.018$, $d=1.5$) than the control group ($M=1,099.60$, $SD=220.31$) with an unrelated video.

4.2. Results for the Training Designs

In the main study, 17 subjects completed the third measurement point. Metacognitive self-regulation improved from the first measurement point to the third measurement point $F(1,13) = 5.62$, $p = .034$, Partial $\eta^2 = .302$ in any of the experimental groups and the control group. Four participants out of 12 with the *SuperProductivity* app reported using the program occasionally at the third measurement point. Similarly, three out of 13 participants with the *Freedom* app reported using the program occasionally at the third measurement point. To gain more comprehensive insights into the factors influencing the adoption or rejection of applications, respondents were asked a set of six assessment queries. Several participants expressed positive views towards limiting distractions and acknowledged the utility of to-do lists, app suppression, and customized blocklists. Various factors contributing to infrequent usage were cited: initial setup challenges, usability issues and technical glitches. Participants also detailed their approaches and alternative applications for managing distractions effectively. In terms of enhancing time organization, individuals often utilize calendars and task lists; while for minimizing distractions, many employ strategies such as activating the do-not-disturb mode, playing pink noise playlists, switching off the phone, utilizing noise cancellation devices or seeking out a calm environment. For quiz questions performance (Table 1), a repeated measures ANOVA3 (rm ANOVA) revealed no significant difference between pre-test and post-test conditions in treatment condition SP (*SuperProductivity*): $F(1, 13) = .09$, $p = .769$, Partial $\eta^2 = .01$; treatment condition *Freedom* app $F(1, 13) = 1.9$, $p = .188$, Partial $\eta^2 = .13$; and treatment condition SP+F (*SuperProductivity* and *Freedom* app) $F(1, 13) = 1.43$, $p = .252$, Partial $\eta^2 = .1$.

Table 1: Mean (=M) and Standard Deviation (=SD) for Pre- versus Post-Treatment on Quiz Performance for Training with *SuperProductivity* (=SP), *Freedom* (=F), and Both (=SP + F)

	Pre		Post		F(1,13)	p	η^2
	M	SD	M	SD			
SP	.71	.14	.68	.11	.09	.769	.01
<i>Freedom</i>	.75	.12	.65	.10	1.93	.188	.13
SP+F	.77	.11	.64	.11	1.43	.252	.10

For the responses to the MSLQ on motivational dimensions (Table 2), an rm ANOVA revealed no significant difference between pre-test and post-test conditions in treatment condition SP (*SuperProductivity*) $F(1, 13) = .90, p = .361, \text{Partial } \eta^2 = .06$; treatment condition *Freedom*, $F(1, 13) = .35, p = .564, \text{Partial } \eta^2 = .03$; and treatment condition SP+F (*SuperProductivity* and *Freedom*), $F(1, 13) = .7, p = .419, \text{Partial } \eta^2 = .05$.

Table 2: Mean (=M) and Standard Deviation (=SD) for Pre- versus Post-Treatment for MSLQ on Motivation Dimensions for Training with *SuperProductivity* (=SP), *Freedom* (=F), and Both (=SP + F)

	Pre		Post		F(1,13)	p	η^2
	M	SD	M	SD			
SP	13.81	2.67	12.70	2.29	.90	.361	.06
Freedom	14.23	2.27	12.78	1.62	.35	.564	.03
SP+F	14.45	2.64	12.45	1.71	.70	.419	.05

For the responses to the MSLQ on metacognitive dimensions (Table 3), an rm Anova³ revealed no significant difference between pre-test and post-test conditions in treatment condition SP (*SuperProductivity*), $F(1, 13) = .26, p = .618, \text{Partial } \eta^2 = .02$; treatment condition *Freedom* $F(1, 13) = .08, p = .784, \text{Partial } \eta^2 = .01$; and treatment condition SP+F (*SuperProductivity* and *Freedom*), $F(1, 13) = .01, p = .936, \text{Partial } \eta^2 = .001$.

Table 3: Mean (=M) and Standard Deviation (=SD) for Pre- versus Post-Treatment for MSLQ on Metacognitive Dimensions for Training with *SuperProductivity* (=SP), *Freedom* (=F), and Both (=SP + F)

	Pre		Post		F(1,13)	p	η^2
	M	SD	M	SD			
SP	11.71	2.77	12.60	2.51	.90	.618	.06
Freedom	11.11	2.19	11.75	2.26	.35	.784	.03
SP+F	10.78	2.44	11.58	2.63	.70	.936	.05

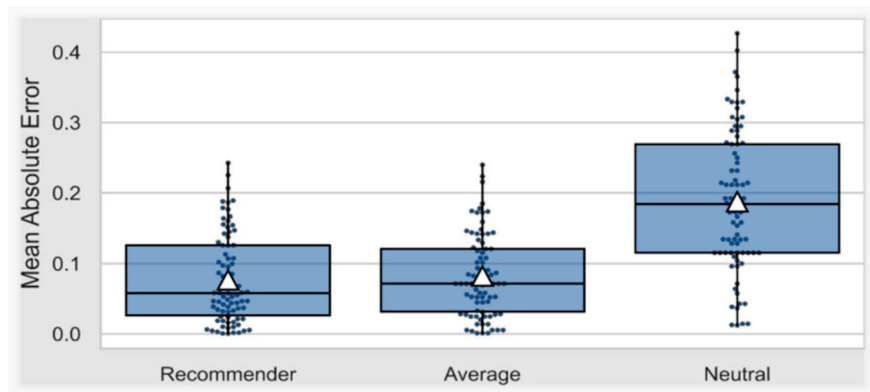
3 Repeated measures ANOVA compares means of one or more variables based on repeated observations. It can include more than one independent variable but has at least one dependent variable that has more than one observation.

4.3. Results for the Predictions with Participants' Profiles

To test whether it is possible to predict learning success based on the collected data, the most important factors were first identified by using Spearman correlation. However, only the data from the first survey period were used for the prediction ($N=82$) since the dropout rate at the other survey points was already too high ($N=24$ and $N=17$, respectively).

After applying a Bonferroni correction, only Self-Efficacy for Learning and Performance correlated significantly with performance ($p < 0.001$, $p_{cor} = 0.006$) at the first survey time point. Subsequently, a user-based collaborative filtering approach was implemented to develop a recommender system. Similarity between users is applied to derive a prediction based on the “neighborhood” of similar individuals. To determine these similarities, a profile was created from the collected data, and cosine similarity was calculated based on the profile. To predict performance at the first survey point, a neighborhood comprising the k of most similar participants was created first. Cross-validation was used to determine the optimal value for k (specifies the number of neighbors to consider), which was $k = 7$. In the next step, the prediction was evaluated based on the performance of the neighbors at the first survey point with a weighting according to the similarity. Here, the recommender achieved an average absolute error of 0.077. In comparison, a strategy based on the average of all users achieved an absolute error of 0.082. A constant strategy, which takes the value .5 and thus represents a completely uninformed prediction, achieves an error of .188. Figure 4 below shows the performance in detail.

Figure 4: Performance in Detail. The Box Plots Show the Quartiles and the Median. The Average is Marked by the Triangle. Additionally, the Performance of Each Individual Participant is Depicted by a Point.



In summary, the performance comparison highlights two things: First, the recommender performs best with all variables, although the correlation of most of them does not reach significance, illustrating that rich profiles generally benefit data-driven models. Second, the performance is only slightly better than the naive baseline, i.e., the av-

erage performance on each quiz. This indicates that there is still too much noise in the data to adequately predict test performance. It is to be expected that most of the noise is unavoidable since students' individual situations during a semester are largely uncontrollable.

5. Discussion

The results of the variance analysis did not yield significant findings for any of the manipulations employed. Despite different correlations, only Self-Efficacy for Learning and Performance of the MSLQ showed significance, indicating that the recommender system performed best when all information was utilized. However, overall, the factors gathered may not be very effective as predictors since they only resulted in a minimal improvement over the average. It is important to acknowledge that this study has noteworthy limitations mainly due to low data density at the third survey time point. These and other constraining factors affecting personality profiles and interventions are specified and elucidated below.

5.1. Comparison with Findings from Prior Research – Learning Strategies

Looking at child development in terms of “learning to learn”, when a child enters school (at age 6 to 7), he or she begins to develop basic strategies and skills for learning, organizing thoughts, managing time, and setting goals. These are typically further developed and extended into early adolescence (Wells, 2021). On the one hand, due to the restriction to specific lectures during the semester, the sample in the present study consisted of young adults (average age $M=22.04$, ranging from 18 years to 37 years; $SD=1.47$) who, according to Wells (2021), most likely already have established learning strategies and skills. Learning a new strategy, which could compete with time, motivation, and other learning content, may not be particularly attractive, so established strategies are preferred, and new strategies are not even needed. This could explain the shallow use of the offered interventions at the survey time points. Furthermore, this is reflected in the data collected. Besides a reported average use of the interventions of $M=1.7$ (1 = not at all; 7 = all the time), a low level of usefulness was also indicated by the questionnaire. On the other hand, Häfner et al. (2014) reported positive effects of applying the developed time management program, which consisted of priority setting and goal setting, strategy development and process simulation, structuring of the workday, and monitoring. However, the sample of Häfner et al. (2014) referred exclusively to students in their first bachelor's semester who were found to have a stressful transition and adjustment process. In the present study, the sample consisted primarily of students in higher bachelor and master semesters. For these, the positive effects of using a time management program could be less pronounced or have no effect, as they have already completed the transition and adjustment process. This is supported by the fact that when asked to comment on the use and usefulness of the apps *SuperProductivity* and *Freedom*, participants reported alternative strategies (e.g., visiting the university library for a distraction-free environment or

simply using flight mode on their smartphones). Consequently, this could also lead to a limiting effect of the offered interventions.

In addition, Häfner et al. (2014) engaged a trainer to deliver a two-hour course on time management. The present study consisted mainly of written instructions and videos, which may have also reduced motivation to use the interventions. Further studies could focus, first, on younger individuals with few or no established strategies and, therefore, might be more likely to benefit from newly offered strategies and skills. This would primarily refer to, for example, students in 5th grade and above. Secondly, the sample could be limited to students in their first semester of bachelor studies (e.g., Häfner et al., 2014), who mainly need support in the transition and adaptation process.

5.2. Comparison with Findings from Prior Research – App Blocking

Tseng, Lee, Denoue, and Avrahami (2019) postulate the importance of breaks at work and during study for productivity and well-being. However, breaks can turn into “cyberloafing” (i.e., using the internet for non-work purposes during work hours) due to too much digital distraction. This can be remedied by the app *UpTime*, presented by Tseng et al. (2019), which is designed to help people return to their actual tasks from breaks. It automatically blocks distracting websites for a certain period. Results show that automatic blocking at such transition points significantly reduces the frequency and duration of visits to distracting websites. In contrast, this study used the *Freedom* app, which requires a manual initiation of distraction blocking. As shown by Tseng et al. (2019), the number of blocking sessions per day decreases from an average of 6.5 when blocking is done automatically with *UpTime*, to 1.26 when blocking is started manually with Pomodoro (like *Freedom*). On the one hand, this could be due to an increase in the threshold for starting manual use; on the other hand, the interventions may have been overlooked throughout the semester as they require proactive initiation.

5.3. Comparison with Findings from Prior Research – Feedback

Apart from this, Hattie and Timperley (2007) postulate that feedback is one of the strongest influences on learning and goal attainment. The influence of feedback depends on several factors, such as the type of feedback, the difficulty of the goals and tasks, and the level at which the feedback is applied. In addition, feedback can be broken down into four levels: feedback about the task, feedback about progress on the task, feedback about self-regulation, and feedback about oneself. Hattie and Timperley (2007) explained that feedback should be adapted to the individual’s level of understanding and desired goals. It should reduce the gap between current performance and the desired outcome. While *SuperProductivity* and *Freedom* can help with goal setting and focused learning intervals, they cannot provide feed-up: Participants must determine how much time they are willing to invest. There is no standard to live up to, which is why they need to be clear about the desired outcome before they can use supporting applications.

In the present study, feedback was provided only on self-regulation with *Freedom* and on task progress with *SuperProductivity*. Follow-up studies should focus on offering concrete suggestions for improvement, such as optimizing study session intervals. Incorporo-

rating ongoing coaching and regular reflections on the learning process would be beneficial for students, providing personalized guidance and support as they navigate their educational journey. After the seminar, students can transition to a more self-regulated mode with the tools and insights gained during the coaching sessions. In addition, two-way communication could be introduced to allow the receiver to ask questions or seek further explanation (e.g., help with the installation or use of the apps).

6. Conclusion

In summary, our study revealed a discrepancy between the intended results and the actual outcomes. Our efforts to enhance training in perceived usefulness and perceived ease of use only led to an improvement in comprehension time for *SuperProductivity*. The offered compensation failed to incentivize participants' completion of our study, highlighting the persistent issue of dropout rates that requires attention. One potential solution could involve pre-selecting participants who perceive time management or distraction blocking as unresolved challenges, are willing to dedicate effort towards improvement, and have not yet found effective solutions. Kim et al. (2017) reported distraction blocking to be more successful the more their participants got distracted by social media.

In addition, the number of participants in the study was restricted due to limitations imposed by course requirements. Upon careful review of the participants' feedback, we identified various challenges that affected their usage of the interventions, including issues with usability, availability of superior alternatives, perceived lack of usefulness, and a mismatch between application features and individual goals. However, there was a slight inclination towards enhancing the recommendation system by incorporating the tested factors. Further research involving suggested modifications, such as using a younger sample group, implementing an automatically activated blocking system and providing more targeted feedback, could yield significant results. Additionally, it may be possible to develop an improved recommendation system for suggesting personalized learning aids based on personality traits.

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Appendix

Appendix I: Quiz Questions

Below are three example questions in German from the assessments in SoSci Survey, which served to evaluate prior knowledge or learning progress. Every set of 8–12 questions pertained to specific lectures and did not overlap with content covered in subsequent assessments. The first two questions are from Teaching and Learning with Media II, and the last two questions are from the seminar Traffic and Mobility.

- Welche Annahmen postuliert die Augmented Cognitive Load Theorie (aCLT)?
 - Affektive Unterstützung erhöht das situationale Interesse
 - Affektive Unterstützung erhöht das personale Interesse
 - Kognitive & affektive Maßnahmen besitzen additive Effekte
 - Kognitive & affektive Maßnahmen besitzen interaktive Effekte

- Nach einer Metaanalyse aus 2015 zeigen sich folgende signifikante Effekte von Feedback beim Lernen:
 - Einfaches Feedback ist besser als kein Feedback
 - Korrigierendes Feedback ist besser als einfaches Feedback
 - Einfaches Feedback ist besser als korrigierendes Feedback
 - Elaboriertes Feedback ist besser als korrigierendes Feedback

- Wie kann Vertrauen in die Automatisierung gemessen werden?
 - Betrachtung der Vertrauensebenen
 - Erlerntes Vertrauen einmal messen
 - Vertrauen vor und während der Interaktion messen
 - Zunahme des Vertrauens vorhersagen

- Zur Messung von Mobilität gibt es verschiedene Indikatoren, welche über verschiedene Basiseinheiten gemessen werden. Welche der genannten sind solche Messeinheiten?
 - Tonnenkilometer
 - Tageskilometer
 - Personenkilometer
 - Anzahl der Wege

Appendix II: Use-Evaluation

This section provides a comprehensive list of the questions that were posed to participants during the third measurement point, aiming to collect data on their experience and duration of use for their received intervention (e.g., *SuperProductivity*, *Freedom*, both, or the *SMART*-Technique).

- Bitte geben Sie an, wie oft Sie in den letzten Wochen die folgenden Programme bzw. Techniken genutzt haben.

Participants were here required to respond by using a Likert scale ranging from 1 to 7 (with one indicating “never” and seven indicating “every day”).

The following questions were open questions.

- Haben Sie den Eindruck, dass Ihnen die im Rahmen dieser Studie angebotenen Programme und/oder Lerntechniken beim Erreichen Ihrer Lernziele geholfen haben?
- Falls Sie *SuperProductivity* und/oder *Freedom* erhalten haben: Was hat Ihnen an den Programmen besonders gut gefallen? Was hat Sie gestört?
- Falls Sie *SuperProductivity* und/oder *Freedom* erhalten haben und das/die Programme nur selten genutzt haben: Was waren die Gründe für die seltene Nutzung?
- *Freedom* war ein Programm, um Störungen und Ablenkungen einzudämmen. Haben Sie selbst Techniken oder Strategien gegen Störung und Ablenkungen? – Können Sie sie kurz beschreiben?
- *SuperProductivity* war ein Programm für Zeitmanagement. Das bedeutet, man kann Lernintervalle (z.B. 25 Minuten Pomodoro-Timer) festlegen, Projekte und Aufgaben planen und bekommt einen Überblick. Haben Sie selbst Techniken oder Strategien für Zeitmanagement? – Können Sie sie kurz erklären?
- Gibt es alternative Software, die Sie für Zeitmanagement oder zur Reduktion von Ablenkungen nutzen (z.B. Funktionen oder Apps mobiler Geräte, PC-Software, Websites)?

Section V:

Artificial Intelligence in the Feedback Process

Using Chatbots for Feedback Exchanges in Educational Settings

Jennifer Schluer

Abstract *Rapid developments in the field of Artificial Intelligence (AI), particularly since the public release of ChatGPT-3 in November 2022 (and of more recent versions), offer several opportunities for enhancing learning and teaching processes. The present paper concentrates on one crucial factor contributing to learning success, which is feedback. After suggesting a definition of chatbot feedback, the chapter outlines various advantages and discusses prevailing limitations. Moreover, the chapter provides recommendations for utilizing chatbots for feedback purposes in educational settings. Altogether, it is argued that chatbots can serve as feedback assistants for teachers and learners and can play a supportive role in the development of learners' and teachers' feedback literacy.*

Keywords *chatbots; artificial intelligence; chatbot feedback; technology-generated feedback; feedback training*

1. Introduction

Recent years have seen a rapid increase in the use of chatbots for various commercial and non-commercial purposes (cf. Essel et al., 2022, p. 1). Especially since the public release of ChatGPT in November 2022, AI-powered technologies have caught the interest of the general public and been vividly discussed since then. They have also evoked an intense debate among educators and researchers regarding the opportunities and dangers coming along with the existence and utilization of these technologies (Qureshi, 2023, p. 1).

Previously, AI had been mainly used for language learning software, translations and text corrections within and beyond the educational realm. The generated feedback, however, was mostly limited to mechanics (e.g. spelling and punctuation) and word choice, while still working unreliably for coherence, style and paragraph structure. This notably pertained to Automated Writing Evaluation (AWE) programs, as discussed by Schluer (2022). Further common drawbacks were the brief and formulaic nature of the comments (Chen & Cheng, 2008, p. 101) as well as the preponderance of negative feedback (Dembsey, 2017, p. 89). It often also lacked a human touch, even though some programs incor-

porated a virtual avatar or provided feedback in conversational language (as reviewed by Schluer, 2022, p. 85). Nevertheless, the unidirectionality of the feedback (from the program to the user) might not only be demotivating for the users but also contradicts the current conceptualization of feedback as part of an ongoing learning dialogue (Schluer, 2022, pp. 33–34). These limitations notwithstanding, the AWE technologies offered several benefits for advancing writing skills and building students' linguistic confidence (Schluer, 2022, pp. 81–83).

With the advent of more mature AI technologies and ongoing developments, however, additional avenues for facilitating educational processes arise for learners and teachers alike. The aim of the current contribution therefore is to review and discuss the opportunities and challenges of utilizing chatbots for feedback processes in educational settings. It will begin with a definition of chatbot feedback and a description of the most recent developments at the time of writing this chapter. Afterwards, the affordances and limitations will be synthesized along with recommendations for practical use. Finally, the chapter will close with a discussion of future needs to further improve AI-powered feedback processes.

2. Definition and Examples

Chatbot feedback refers to the use of artificial intelligence (AI) in chatbot applications to interact with a human user and provide written or oral feedback to submitted data and prompts. These chatbots have been trained on a vast amount of data (Ray, 2023, p. 133) and utilize Natural Language Processing (NLP) as well as sentiment analysis (Khanna et al., 2015, cited by Adamopoulou & Moussiades, 2020, p. 1) to analyze the user's input and provide personalized feedback on assignments, quizzes, or other learning tasks. The chatbot feedback system aims to simulate human-like interaction while offering students timely and constructive feedback, answering their questions, and assisting them in their learning process (Adamopoulou & Moussiades, 2020, p. 1; Chang et al., 2022, p. 15; Yin et al., 2021, p. 155). Furthermore, chatbots can produce samples of feedback requests, feedback interactions and action plans, which may serve as a model or inspiration for learners to become more active participants in the feedback process. Likewise, teachers can prompt chatbots to generate more elaborate and detailed feedback than they could offer themselves for reasons of time (Dai et al., 2023a, p. 323; Essel et al., 2022, p. 4).

All in all, the pedagogical roles of chatbots can be of various but often interconnected and increasingly overlapping kinds. Wollny et al. (2021, p. 12), for instance, distinguished between the functions of learning, assisting, and mentoring. The learning role refers to “the support in learning or teaching activities”, such as knowledge acquisition (Wollny et al., 2021, p. 12). The assisting function is understood as the provision of services for managing everyday life (Wollny et al., 2021, p. 12). The mentoring role, in turn, more specifically denotes the support of learners' personal development, e.g. by fostering their self-regulated learning (Wollny et al., 2021, p. 12). Others suggested a more general differentiation between chatbots as learning assistants and chatbots as teaching assistants. The latter are alternatively labelled “classroom assistants” and offer functions such as generating knowledge and providing intelligent feedback (as summarized by Essel et al., 2022,

p. 2). For both learners and teachers, the affordances of chatbots' feedback functionalities will be reviewed in this chapter.

While many AI-powered chatbots exist, ChatGPT has initially attracted most attention. Beforehand, chatbots had mainly been used by companies, e.g. for "automated customer service support" (Qureshi, 2023, p. 2), "website support" (Fryer et al., 2020, p. 9), or feedback surveys about client or employee satisfaction (cf. Lechler et al., 2019, p. 10). Accordingly, the majority of research papers concentrated on these contexts of use (see e.g. Lechler et al., 2019). In November 2022, though, OpenAI made ChatGPT (version 3) accessible to the general public (at <https://chat.openai.com/>), which has evoked vivid discussions in the academic sphere since then. GPT stands for "generative, pre-trained transformer" and is an advanced AI-powered chatbot which "uses a combination of deep learning and statistical methods to generate high-quality text" (Frackiewicz, 2023, n.p.). The successor ChatGPT-4 was trained on an even more extensive database of 570GB (Qureshi, 2023, p. 2) and was launched in May 2023 (Frackiewicz, 2023). With this large database and computational mechanisms, it can mimic human conversations more realistically (Kohnke et al., 2023, 2) and provide extensive output when prompted appropriately (Qureshi, 2023, p. 6; Schmied, 2023, p. 8). This "tool for natural language generation (NLG)" (Frackiewicz, 2023, n.p.) can produce more natural-sounding, detailed and context-specific responses for a vast array of topics than other tools before (Dai et al., 2023a, p. 323). By contrast, AI-powered digital assistants, such as Alexa or Siri, were mainly able to perform simple tasks upon request, as for instance switching on the light or the radio or reporting the weather forecast for a particular region (Kohnke et al., 2023, 2). As opposed to this unidirectionality, ChatGPT permits more elaborate "back-and-forth conversations" with its users (Kohnke et al., 2023, p. 2), which makes it more compliant with current feedback conceptualizations.

According to contemporary perspectives, feedback is regarded as a dialogic and interactive process aimed at enhancing learning processes and outcomes (Schluer, 2022, pp. 17, 33). Therein, feedback ideally operates in a cyclical or spiral-like manner towards continuous improvement (see Carless, 2019, and the illustration by Schluer, 2022, p. 44). In this process, learners and teachers adopt complementary responsibilities. More precisely, learner feedback literacy pertains to students' understanding, attitudes, and abilities to seek, provide, comprehend, and utilize feedback, as well as manage emotions (Carless & Boud, 2018, pp. 1316–1317). Conversely, teacher feedback literacy encompasses educators' capabilities to design learning environments that are conducive to students' feedback literacy development. This involves planning and coordinating feedback activities to facilitate proactive and multidirectional feedback exchanges, as well as fostering reflective and effective feedback utilization (Boud & Dawson, 2023, p. 158; cf. the review by Xie et al., 2022, pp. 28–29). The supportive role of chatbots in these processes will be considered in this chapter.

In the following sections, the discussion of advantages, limitations and possible implementations will not exclusively, but primarily center on ChatGPT to exemplify recent developments at the time of writing the chapter.

3. Affordances

ChatGPT (and similar chatbot technologies) can be used beneficially for manifold educational purposes. Several advantages thus arise, both for teachers and for learners, which will be outlined in the following sections.

3.1. Chatbots as Feedback Assistants for Teachers

Especially in classes with numerous students, the provision of individual support becomes challenging for educators. In that regard, chatbot adoption can enable personalized assistance for each student by catering to their unique knowledge levels and learning paces (Essel et al., 2022; Kuhail et al., 2023, p. 974; Mageira et al., 2022, pp. 2–3; Zhang et al., 2023, p. 14). This can result in a substantial reduction of teachers' workload (Escalante et al., 2023, p. 13) as well as better student support. For instance, (in- and pre-service) teachers might use AI to generate ideas and tasks for teaching, to create lesson plans and syllabi (Schmied & Ivanova, 2023, p. v), as well as personalized assessments, including open-ended or multiple-choice questions, quizzes, and exams that are tailored to the student's proficiency level (cf. Amin, 2023, p. 3; Bommasani et al., 2021, cited by Cotton et al., 2023, p. 2; Wahyudi, 2023, p. 1). Moreover, and most relevant for this chapter, is the possibility to obtain AI feedback on learner texts (or other assignments). For instance, instructors could enter a(n anonymized) student text (e.g. essay or exam) into ChatGPT, together with a specification of the assessment criteria according to which the submission should be analyzed. In their study about ChatGPT's capacity to provide feedback to students on a data science project at an Australian university, Dai et al. (2023a) fed the following prompt into the chatbot:

"Please give feedback on the following text in terms of a clear description of the goals of the project, appropriateness of the topic to data science, clear description of the business benefits, novelty/creativity and overall clarity of the report. <INSERT THE TEXT OF A REPORT>." (p. 324)

They pasted each student's report into ChatGPT and obtained generated feedback (Dai et al., 2023a, p. 324).

This process can be facilitated even further through continuous improvements of the bot. For instance, on August 03, 2023¹, OpenAI announced on their Twitter account that it will soon be possible to upload multiple files for analysis. However, these and other functions are only available for Plus users who subscribe to the premium version and thus have access to the more powerful ChatGPT-4. Moreover, they stated that it also allows to "generate insights across multiple files", which brings along several benefits for feedback processes as well. Assessors could thus compare students' performance within the classroom or over time for each learner. Coupled with learning analytics dashboards and digital feedback portfolios, this could provide a fruitful avenue for future feedback practices. Furthermore, on the classroom level, teachers can analyze conversation logs

1 <https://twitter.com/OpenAI/status/1687159114047291392>

and statistics generated during student interactions, helping them identify areas of difficulty and weaknesses in students' understanding (Mageira et al., 2022, pp. 2–3; cf. Essel et al., 2022).

In their study, Dai et al. (2023b) also compared the readability and nature of the feedback generated by ChatGPT with the feedback provided by a human instructor. They found that the bot-generated feedback was more detailed, more consistent and more process-oriented, more prose-like and more positive as well as “significantly more readable than instructor feedback ($p < 0.001$, examined by paired t-test)” (Dai et al., 2023b, p. 4). While the readability scores ranged between 3.75 to 4.0 for the ChatGPT output, more than three quarters of the instructor feedback was below the score of 3.75 (Dai et al., 2023a, pp. 324–325). Nevertheless, the generated feedback showed high agreement with the human rating along the five dimensions of the marking rubric (Dai et al., 2023b, p. 2). In terms of content and structure, the chatbot feedback commonly started with a brief summary of the student work, followed by an evaluation as well as “an explanation of how this feedback was given” (Dai et al., 2023b, p. 4) and suggestions for learning strategies that could enhance students' performance further (Dai et al., 2023b, p. 2). By contrast, the feedback by the human instructor “consisted mostly of simple expressions about the evaluation of student performance” (Dai et al., 2023b, p. 4).

In fact, the brevity of written feedback produced by human assessors is a phenomenon that has been widely observed in the literature and in teaching practice. The main reason for this is the high amount of time that humans need in order to produce elaborate written feedback. Several scholars have therefore investigated alternative ways to accelerate the process of feedback provision and to offer more comprehensible and detailed explanations at the same time. One of these suggestions is to use the oral modality or audiovisual feedback, e.g. in the form of screencast feedback (Schluer, 2020). Another frequently cited option is the combination with automated feedback, e.g. by using AWE software (Kim, 2018, cited by Schluer, 2022, pp. 207, 233). Beforehand, however, the automated comments mainly seemed to be useful for simple corrections of spelling and grammar, while showing several limitations with regard to feedback on the content (cf. the review by Schluer, 2022, pp. 78–91). Large language models, as they are used in more recent technologies (e.g. in ChatGPT), can help to overcome this limitation (e.g. Escalante et al., 2023, p. 12).

Especially when teachers have to deal with large numbers of students in their classes, AI-enhanced feedback can be a useful supplement, while they still need to be aware of its limitations (see section 4 below). Even before the advent of ChatGPT-3, other chatbots were used to help teachers manage a high amount of student queries. For example, in the research reported by Essel et al. (2022), a chatbot was incorporated into a messenger app to provide automatic responses to students in Ghanaian higher education. Outsourcing replies to simple student queries to AI-powered bots might lead to a reduction of teachers' workload (Essel et al., 2022, p. 2). Furthermore, it has been argued that summative assessments produced by ChatGPT can free up teachers' time so that they can concentrate more on high-level tasks, such as formative feedback provision and student support (Cotton et al., 2023, p. 3; cf. Qureshi, 2023, p. 1). Yet, with continuous advancements, chatbots can help teachers to assess student work formatively as well (cf. Kohnke et al., 2023, p. 2).

Teachers could also ask ChatGPT to produce assessment rubrics and to apply them to the submitted texts (see Gönen, 2023, cited in chapter 1 in this volume). Such an AI-supported application of assessment rubrics to submitted texts might create greater consistency and objectivity in feedback provision and the grading of student work (see the study by Dai et al., 2023b, p. 5; cf. Cotton et al., 2023, pp. 2–3; Escalante et al., 2023, p. 12; Qureshi, 2023, p. 1). Going beyond corrections, ChatGPT has the capacity to generate suggestions for further learning as well as to produce “personalized learning materials” (Qureshi, 2023, p. 3). Furthermore, the latest AI systems continuously adapt to the learner’s progress and can thus finetune the feedback (Amin, 2023, p. 8). Such timely, individualized and elaborate feedback can help to create a “more engaging learning experience for the students” (Essel et al., 2022, p. 2). The learners’ perspective will therefore be inspected next.

3.2. Chatbots as Learning Assistants

As learning assistants, chatbots can fulfill multiple functions. Zhang et al. (2023) reviewed the advantages that were pinpointed in previous studies from a pedagogical perspective and summarized them by using the acronym “RAISE”, which stands for “Repetitiveness, Authenticity, Interactivity, Student-centredness, and Enjoyment” (p. 13). They will be discussed in the current contribution as well, albeit in different order.

To start with, one major advantage of chatbots as learning assistants is that they can provide students with rich linguistic input, which is particularly beneficial for language learning. AI-driven chatbots might thus serve as convenient and accessible language partners, especially when foreign language instructors are not readily available (Haristiani, 2019, p. 4; cf. Fryer et al., 2017; 2020; Ruan et al., 2021, p. 434). They offer learners an opportunity to practice language skills endlessly, enabling them to explore a wide variety of language input that they might not encounter with traditional classroom partners (Fryer et al., 2020, p. 16). However, it needs to be borne in mind that the database on which the AI system has been trained is limited in scope linguistically, culturally, and temporally (Ray, 2023, p. 147; see section 4.3). Especially when English is used as a lingua franca by people with different linguistic backgrounds, human language partners are likely to produce more authentic input.

Additionally, though, chatbots are capable of repeating the same material as many times as needed (Haristiani, 2019, p. 4; cf. Fryer et al., 2020, p. 16). Hence, students can progress at their own pace and can continuously become more self-directed in their learning (Essel et al., 2022, p. 4). Citing the study by Cai et al. (2020), Zhang et al. (2023) remarked “that the chatbots allowed students to practise repeatedly and make constant self-correction based on the chatbot feedback, helping them gradually enhance their accuracy and fluency of speaking” (p. 10). Likewise, ChatGPT can offer tailored assistance to guide students to improve their skills and help them in problem-solving (Qureshi, 2023, p. 6), such as by suggesting learning techniques and resources that they could engage with (cf. Cotton et al., 2023, pp. 2–3; Dai et al., 2023b, p. 5). Hence, they can take control of their learning and progress at their own pace without being dependent on teachers’ availability (Essel et al., 2022, p. 4).

Indeed, after the presentation of learning materials on rank one, performance evaluation and feedback provision were the second most frequent types of pedagogical application found in Zhang et al.'s (2023) review of chatbot studies (p. 6). To exemplify, learners can formulate specific feedback requests and enter them into the ChatGPT interface, together with their work in progress. For this, they obtain immediate feedback at any time and place (Essel et al., 2022, p. 14; Haristian, 2019, p. 4; Mageira et al., 2022, p. 3) “[t]hrough a broad range of devices” with internet access (Fryer et al., 2017, p. 463). The immediate feedback helps to eradicate errors at an early stage already (Wahyudi, 2023, p. 3). Moreover, the speedy responses might lead to greater engagement, especially if learners consider them as relevant. As such, the availability of AI chatbots can “promote learning outside of the traditional classroom setting” (Alshahrani, 2023, p. 2035).

There also exist chatbots or extensions that do not only allow for written exchanges, but also for audio interactions (Fryer et al., 2017, p. 463). Moreover, ChatGPT can provide feedback in multiple languages, making it useful for language learners who want to improve their skills in languages other than their native language. These multilingual interactions (Kohnke et al., 2023, p. 4) might be particularly profitable for foreign language learners at the beginner level (see final chapter 17 by Schluer in this volume).

Related to that, the AI system can assess learners' proficiency and provide them with tailored tips for improvement (Frackiewicz, 2023; cf. Farrokhnia et al., 2023, p. 5). In addition, ChatGPT remembers past conversations (Farrokhnia et al., 2023, p. 3), which enhances its potentials for formative feedback. In the future, a more comprehensive consideration of individual learning histories also appears likely to further improve the personalized support (cf. Qureshi, 2023, p. 6). So far, ChatGPT has already demonstrated the ability to provide valuable process-focused feedback, which is considered effective in shaping students' task strategies and developing learning skills (Dai et al., 2023b, p. 5). It thus moves beyond a simple checking of grammar and linguistic correctness, as many AWE tools do. This personalized guidance can also boost learners' motivation (cf. the review by Kohnke et al., 2023, p. 2), especially when paired with positive feedback (see Dai et al., 2023b, p. 4). Crucially, ChatGPT provides explanations, not only for negative feedback but also for positive feedback. This way, users learn about the reasons for the (in-)correctness of the text that they have entered. This can be valuable for raising learners' language awareness and for improving their future performance. Further affective and (meta-)cognitive benefits will be elaborated next.

3.3. Affective Benefits for Learners

Chatbots can contribute to the learning experience not only (meta-)cognitively, but also affectively, for example regarding motivation, interest, and self-efficacy (Zhang et al., 2023, p. 12). Many students are scared or too shy to seek help and ask questions to their teachers, especially when they feel that their request might bother other students or the teacher or slow down the overall progress in class. This is particularly true of classroom contexts in which learners perceive a high power distance (cf. Kohnke et al., 2023, p. 2). Students might also be afraid of making mistakes and of the resultant negative feedback (Oktaria & Soemantri, 2021; Verleger & Pembridge, 2018; both cited in Essel et al., 2022, p. 4). It could make them appear incompetent (Fryer et al., 2020, p. 16), especially when

“communicating in a foreign language” (Ruan et al., 2021, p. 435). Accordingly, they do not dare to seek assistance for reasons of shame and lacking self-confidence. Chatbots, in turn, could reduce language anxiety by providing a non-authoritative (Li et al., 2023, p. 38) and non-judgmental learning environment (Essel et al., 2022; Ruan et al., 2021) in which the learners can ask questions, request feedback (Essel et al., 2022, p. 3) and practice their language skills (Amin, 2023, p. 8; Brinegar, 2023, p. 224; Fryer et al., 2020, p. 16; Hoang et al., 2023, pp. 151–152; Kohnke et al., 2023, p. 2). They provide feedback without any biases or preconceptions, which makes them a non-judgmental source of feedback that can help users improve their writing skills without feeling embarrassed or judged (cf. the review by Zhang et al., 2023, p. 14). It has consequently been argued that chatbots offer users comfortable and efficient assistance by responding directly to their problems in an attractive and friendly manner (Adamopoulou & Moussiades, 2020, p. 1). Through engaging answers, they can even make the learning experience more enjoyable (Adamopoulou & Moussiades, 2020, p. 1; Ruan et al., 2021, p. 434; cf. Tseng et al., 2020, cited by Zhang et al., 2023, p. 12).

Overall, the following affective benefits of chatbots for feedback provision stand out (cf. Lechler et al., 2019): Feedback can be sought at any time and about almost any topic in a risk-free environment. The instantaneously provided feedback can be motivating and confidence-building (Frackiewicz, 2023; see also Zhang et al., 2023, p. 12; Wahyudi, 2023, p. 3), particularly since it may give learners a feeling of acknowledgment, appreciation and care. Empathy can be conveyed through emotionalized language and the recognition of previous efforts. It can stimulate an achievement orientation and foster a sense of growth. The positivity in the formulation of feedback can lead to a faster adoption of suggestions even though it gives the learners a sense of choice.² This, in turn, can promote learner agency and autonomy. As such, it can increase students’ willingness to learn and facilitate competence development. One major catalyst of this continued improvement probably is the conversational nature of the chat interactions, which can help them stay motivated (Frackiewicz, 2023) and will be treated next.

3.4. Human-Like Conversation

As Kohnke et al. (2023) emphasized, “[i]ntelligent chatbots have caught the attention of language educators because they can interact with learners in their target language instantly and realistically (Fryer et al., 2020; Lee et al., 2020)” (p. 1). They can simulate human conversation (Frackiewicz, 2023) and might even promote social interaction abilities (Ruan et al., 2021, p. 434). Chatbots have therefore alternatively been termed “conversational agents” (cf. Zhang et al., 2023, p. 4). As ChatGPT has been trained on a large data corpus, the responses sound more natural and context-specific than those from preceding chatbot types (Dai et al., 2023b, p. 1). Apart from written interactions, voice conversations are also possible with chatbots to a certain extent (cf. the review by Essel et al., 2022, p. 2; Kohnke et al., 2023, p. 1).

2 However, in ChatGPT, there is also the possibility for custom instructions in which users might specify their need to get brief answers in a more neutral tone (see section 5.3 in this chapter).

The two-way interactions (Kohnke et al., 2023, p. 2) are further enhanced by improvements to ChatGPT-4. To help overcome writer's block (Duval et al., 2020, cited in Cotton et al., 2023, p. 2) and engage the users, ChatGPT introduced prompt examples at the beginning of each chat (OpenAI via Twitter on August 03, 2023). Furthermore, with the August 2023 update, ChatGPT additionally suggests possible ways to continue the conversation (OpenAI via Twitter on August 03, 2023).

ChatGPT can hence solve several problems that had been reported about other chatbots in the previous literature, such as the limited personalized support, its "inauthentic" appeal (Fryer et al., 2017, p. 463), and the reduced range of possible areas of application. For example, Adamopoulou and Moussiades (2020) noted that "human–chatbot communication has noticeable differences in the content and quality in comparison to the human–human discussion" (p. 1), whereas Dai et al. (2023b) argued that this disadvantage has been resolved to a certain extent, as "specific training allows ChatGPT to generate more natural-sounding and context-specific responses" (p. 1). Moreover, the user interface is "simple and intuitive" (Essel et al., 2022, p. 2), making it easy to use (*ibid.*, p. 12) and lowering the threshold for interaction even further.

Due to the chatbot's conversational nature, it is frequently applied in language learning (Amin, 2023, p. 8; Haristiani, 2019; Zhang et al., 2023, p. 9), e.g. learning EFL/ ESL (Fryer et al., 2017; 2020) or Japanese (Haristiani, 2019, p. 3). In that respect, chatbots can be used for a wide range of assignments, depending on their specific features. For example, ChatGPT can be utilized for written assignments to produce feedback on grammar, spelling, writing style and text structure. Mondly and Duolingo more specifically support the learning of grammar and vocabulary. English Liulishuo, in turn, can be utilized for oral practices, particularly by Chinese-speaking students practicing speaking in English (Ruan et al., 2021, p. 436). With its quick development, chatbots can now be employed in many other subjects as well, such as computer science (Abbasi et al., 2019; Qureshi, 2023), nursing education (Chang et al., 2022), engineering (Kohnke et al., 2023), etc.

3.5. Idea Generation and Reflection

Apart from submitting a draft to the system, learners can benefit from generative AI already before writing a paper. In addition to corrections, it could be deployed to generate ideas and provide information about a certain topic. Learners can thus brainstorm ideas and collect different perspectives, either before starting to write or while crafting a paper.

Whenever students ask for feedback on a piece of work, the system could stimulate further reflections (Schmied, 2023, p. 12). Learners, however, should not directly copy the suggested ideas (as this would constitute academic fraud, see section 4 below), but regard them as a starting point for critical reflection and searches in approved resources and reliable databases (Schmied, 2023, p. 12). Moreover, the stereotypical output of the AI system does not necessarily comply with the standards that are set by a particular discipline or teacher, nor does it represent the uniqueness of an academic writer, which means that the generated output requires modification and refinement (Schmied, 2023, p. 12).

To give an example, Cotton et al. (2023) composed their paper entitled "Chatting and cheating: Ensuring academic integrity in the era of ChatGPT" almost completely by making use of ChatGPT. Mainly, they relied on the prompted ChatGPT output while only

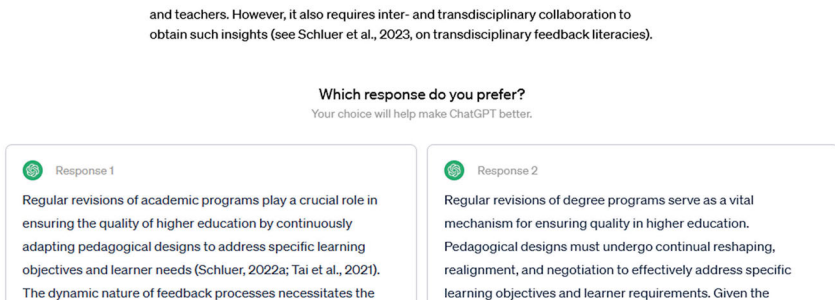
adding the sub-headings and references manually (p. 6). This article has rapidly attracted widespread attention, with almost 50,000 reads within a couple of months. In the paper, they list several advantages and limitations of ChatGPT as well as potential instructional techniques, as suggested by ChatGPT itself. Some of these points are also cited in the present contribution and backed up by additional evidence.

3.6. Feedback to the Chatbot

So far, we have seen that chatbot feedback can be useful for teachers and learners alike. Teachers can ask ChatGPT to give feedback on students’ texts, and learners can utilize chatbots for self-feedback. In addition, the AI system relies on the users’ feedback to further improve its self-learning mechanism. As Essel et al. (2022) explain, “AI relates to systems or machines that mimic human intelligence and self-alter based on accumulated data (Angelov et al., 2021)” (p. 3). The AI-powered chatbot can hence “continuously learn from prior interactions [and thus] improve over time” (Kohnke et al., 2023, p. 2).

On the start page, OpenAI explicitly encourages the users to provide feedback about the accuracy of the responses (“This system is optimized for dialogue. Let us know if a particular response was good or unhelpful”). For this, they may use the thumbs-up or thumbs-down symbols that are placed below each generated response (Kohnke et al., 2023, p. 9). In a pop-up window that appears, they can provide additional feedback by stating the problem and suggesting potential solutions in an open-response field and/or by ticking one or several of the given options (“This is harmful/ unsafe”, “This isn’t true”, “This isn’t helpful”). Furthermore, for regenerated answers, they can vote with a thumbs up, thumbs down, or equal sign. Sometimes, ChatGPT directly produces two solutions, asking the user to select the one they find more suitable (see Figure 1). Additionally, users can visit OpenAI’s discord server to give more detailed feedback (<https://discord.gg/openai>).

Figure 1: Response Preferences in ChatGPT



Another way to provide feedback to the system is to reply to the generated output in the chat itself, e.g. by specifying in how far the response was useful or incorrect. Often, it already helps to formulate the prompt in a different and more precise manner so that ChatGPT can resort to relevant data (see the importance of adequate prompts in section

5). Moreover, users could ask the chatbot to review its own output and provide feedback on it (Gharani, 2023).

Finally, there is still another contribution that ChatGPT can make to the feedback process, which is fostering users' feedback literacy and learner agency. The details will be shared in section 5, while a brief preview will be given in the subsequent subsection.

3.7. Chatbots as Feedback Models

Above, we have discussed that AI can be used for language modeling, providing learners with examples of correct language and helping them develop a more accurate understanding of grammar, vocabulary, and syntax. Moreover, ChatGPT has the capacity to model various text genres (Kohnke et al., 2023, p. 4), such as business letters or academic essays. This capability can also be exploited for developing learners' and (pre-service) teachers' feedback literacy.

A feedback process ideally starts with learners actively seeking guidance from their teachers, as this presupposes self-reflection about their own work in progress. One feature of ChatGPT is to generate questions about a text or topic (Kohnke et al., 2023, p. 8), including questions that could be asked to initiate a feedback dialogue. Hence, chatbots are not only capable of responding to feedback, but also to model the initiation of a feedback exchange (see example in section 5). This, in turn, can stimulate further questions from the students (Essel et al., 2022, p. 4), lower the threshold of daring to ask questions, and may ultimately foster learners' agency in the feedback process.

The same is true of follow-up conversations and actions: Once learners have received feedback from their teacher or peer, they can utilize ChatGPT to seek guidance in developing an action plan and to clarify open questions that the previously provided feedback did not answer. As shown in the study by Dai et al. (2023a), the chatbot-generated feedback often appears to be more readable and comprehensible as well as process-oriented towards further improvement. Moreover, students could use ChatGPT again to obtain potential follow-up questions that they could ask to their teacher or peer.

To seize these affordances of ChatGPT, the process should be explained and introduced by the teacher beforehand. Accordingly, educators themselves need to be aware of the chances and challenges of ChatGPT. They can utilize a feedback conversation generated by ChatGPT in order to analyze its structural components and linguistic features together with the learners (see samples in section 5). In the classroom, they should also brainstorm alternative phrases and questions that could replace the ones suggested by the generated model. Furthermore, they can discuss modifications of the model for different assignment types and feedback modes (e.g. written, oral, or video feedback).

Teachers may ask ChatGPT to create texts and feedback in different proficiency and complexity levels (Farrokhnia et al., 2023, p. 5; Schmied, 2023, p. 10). Moreover, the tone and length of the feedback can be adjusted when prompted accordingly (see Farrokhnia et al., 2023, p. 5, for examples). Chatbots can thus be used to generate reviews that exemplify positive, negative and balanced feedback (Schmied, 2023, p. 11). These could be used profitably for feedback training in teacher education or in classrooms. Pre-service teachers can try to identify characteristics of balanced feedback and reflect on the impact of overly positive and negative feedback, respectively. Similarly, by closely analyz-

ing the linguistic features, especially in comparison to overly positive and negative examples, learners' language awareness can be raised (cf. Schmied, 2023, p. 11). This might also leverage their own feedback provision, e.g. when being asked to engage in peer feedback processes for the first time.

Finally, it would be important to critically discuss the ChatGPT output with the learners when the AI system is used for self-feedback on a submitted draft. They need to become aware of the typical nature of the prompted feedback and the limitations of the AI output. Unless prompted differently, the generated feedback is often formulated in a positive and inoffensive manner (e.g. "In Italian, we prefer to say X and not Y"; Schmied, 2023, p. 12). Linguistically and culturally, this can be challenging for learners who have difficulties in understanding implicit and hedged suggestions. Moreover, they need to realize that the generated suggestions can be wrong, thus requiring their own critical thinking and search skills to verify the correctness of the AI output.

3.8. Learning Gain

While it has been widely argued that ChatGPT (and similar chatbots) can be beneficially deployed to assist teachers and learners in the feedback process, the actual learning gain is disputed (Farrokhnia et al., 2023, p. 11; cf. the review by Zhang et al., 2023), especially from a long-term perspective. Moreover, the experimental evidence is still limited to a few disciplines and assignment types. For example, Pardos and Bhandari (2023) "found that 70% of the hints offered by ChatGPT led to positive learning gains for students" with regard to "elementary and intermediate Algebra topics" (as cited by Qureshi, 2023, p. 3). Essel et al. (2022) focused on a multimedia programming course and concluded that "the experimental cohort who engaged with the chatbot performed better than students in the control cohort who interacted with the course instructor" (p. 14). Conversely, Basic et al. (2023, cited by Qureshi, 2023, p. 3) conducted a small-scale study and inferred "that ChatGPT does not necessarily improve essay quality." These mixed results lead us to a discussion of the challenges and limitations of chatbot feedback.

4. Challenges and Limitations

On the start page of ChatGPT, OpenAI already draws the users' attention to the limitations of the chatbot (at least pertaining to ChatGPT 3.5 as of August 4, 2023):

- May occasionally generate incorrect information
- May occasionally produce harmful instructions or biased content
- Limited knowledge of world and events after 2021

These and additional limitations will be discussed in the present section with particular regard to feedback processes.

4.1. Difficulties in Interpreting Input and Providing Accurate Output

One major limitation of ChatGPT (and other chatbots) is that their capability to interpret the input and generate adequate output is limited (e.g. Farrokhnia et al., 2023). Since ChatGPT has been trained on a limited (albeit huge) database, AI chatbots could have problems in accurately recognizing and interpreting natural language, particularly in languages other than English (Mageira et al., 2022, p. 3). For instance, chatbots may have difficulties in understanding users' questions and prompts (Qureshi, 2023, pp. 3, 6) so that the resultant feedback might be of limited use. Notably, chatbots may also struggle to answer complex, open-ended, or unexpected questions (Bailey et al., 2021, cited in Zhang et al., 2023, p. 13), causing frustration among students or even erroneous learning (cf. Mageira et al., 2022, p. 3). A main reason for this is that a chatbot usually has less specific contextual background knowledge about a users' needs and learning trajectory than a teacher or fellow student who is well familiar with the learner. Moreover, the AI system does not have the profound knowledge of a human subject matter expert and may thus lack a thorough understanding of underlying concepts (Qureshi, 2023, p. 3; cf. Grassini, 2023, p. 6). Also, it "lacks the human ability to assess the credibility of the data it was trained on" (Farrokhnia et al., 2023, p. 7, with reference to Lecler et al., 2023). This can lead to inaccurate feedback and recommendations for specific learning contexts. For instance, Dai et al. (2023b) remarked that "ChatGPT could not offer a reliable assessment of student performance compared to the instructor" (p. 5). To increase the reliability, it would be necessary to "train ChatGPT by feeding examples including students' assignments of different quality and associated golden feedback that accurately evaluates their performance" (Dai et al., 2023b, p. 5). In the end, "chatbots are only as good as the datasets of text and statistical patterns that they are trained on", as Aithal and Silver (2023) noted (n.p.).

Another problem is that the ChatGPT output quite often looks promising at the textual surface, but demonstrates difficulties at the deeper, conceptual level (cf. the reviews by Farrokhnia et al., 2023, pp. 6, 8, and by Grassini, 2023, p. 6). Indeed, ChatGPT has attracted attention due to its capacity to produce "credibly sounding texts" (Schmied & Ivanova, 2023, p. v). While the generated texts might look convincing at first sight (especially due to its linguistic accuracy, clear structure and the use of fitting cohesive devices), they "can give false confidence to users" since the information provided may not be fully correct or could even contain invented links and references (Schmied & Ivanova, 2023, p. v). For example, Qureshi (2023) discovered inaccuracies and inconsistencies in the code that was generated for a programming assignment, which affected overall performance. Furthermore, Cotton et al. (2023) spotted fictional references in the ChatGPT output and replaced them by genuine ones to compose their paper (p. 7). In addition, the AI does not always provide stylistically appropriate answers. Sometimes, it is already helpful to give very specific commands to ChatGPT, e.g. about the genre of the submitted text. Schmied and Ivanova (2023) therefore argued that users not only need the skills to write adequate prompts but also critical text-analytical skills to scrutinize the generated output (p. v). Similarly, Dai et al. (2023b) reasoned that "prompt engineering" should play a greater role in the future to ensure higher effectiveness (p. 5). Moreover, the AI system also needs more training and a more reliable mechanism for controlling the quality of

the generated output. Nevertheless, learners should check the information that ChatGPT gives in order to prevent problems in their assignments.

4.2. Immediate Responses Instead of Guidance

While it has been argued that ChatGPT can be a useful facilitator of learning and feedback processes, it may not fulfill this guiding role in a pedagogically adequate manner. It tends to give corrections rather quickly instead of guiding the users to come up with the correct solution on their own, e.g. through pinpointing the erroneous passage and asking questions about it. This is because ChatGPT's primary purpose is to generate responses to user inputs based on the patterns it has learned from the massive amount of data training. Thus, it may not always be capable of guiding users through the process of identifying and correcting errors themselves. As a result, an over-reliance on AI might diminish learners' ability to self-correct and engage in "critical thinking and independent problem-solving" (Ray, 2023, p. 140). However, as compared to the usually brief corrections by human assessors, it formulates the suggestions in an action-oriented manner, and users often need to access relevant resources on their own or ask follow-up questions to the system. Nevertheless, "it may not necessarily improve critical thinking and problem-solving skills" (Qureshi, 2023, p. 1) as a teacher could do. This is primarily due to the dearth of detailed back-and-forth interactions and the systems' "[i]nability to think in depth" (Essel et al., 2022, p. 13). Sometimes the chatbot also generates almost the same response when asked to reformulate the reply, or it repeats the same response for a different question (Essel et al., 2022, p. 13). Efforts are made to improve ChatGPT's capacity, e.g. by automatically suggesting prompts for follow-up interactions (OpenAI via Twitter on August 03, 2023). Probably, though, chatbots will not be able to raise further questions as human language partners would do based on their individual and interpersonal knowledge.

Another difficulty arises from the often definite and "authoritative nature of the responses", which "can lead users to take them at face value" (Kohnke et al., 2023, p. 9), even though the output might be erroneous. These ready-made solutions could decrease learners' ability to think critically and autonomously as well as undermine their unique identity as a writer (Schmied, 2023, p. 12). Quite often, the output sounds stereotypical of a particular genre without creative deviations that might be necessary to solve a new task and could help advance a field further (cf. Qureshi, 2023, p. 3). In addition, the replies are often wordy and repetitive (Adamopoulou & Moussiades, 2020, p. 13; Kohnke et al., 2023, p. 9; Ray, 2023, p. 148), thus lacking the conciseness that might be needed in a specific context. When prompted to list its own limitations regarding feedback provision, ChatGPT acknowledges that it can only offer "limited feedback on creative writing: While ChatGPT can provide feedback on grammar and style, it may not be as effective in providing feedback on creative writing, such as poetry or fiction" (OpenAI, 2023b). At present, chatbots are therefore not yet suitable for all kinds of assessment tasks and learning objectives (Lo, 2023; Schmied & Ivanova, 2023).

Finally, ChatGPT has not yet been optimized for feedback purposes with regard to the way in which the comments are provided (Escalante et al., 2023, p. 14). In contrast to AWE programs, it does not annotate an existing text through in-text comments or col-

oring (as e.g. Grammarly does) but produces feedback in prose form. While such lengthy comments provide language learners with additional input, they might impose too much cognitive load for students at lower proficiency levels (cf. Li et al., 2023, p. 38).

4.3. Ethical Concerns

There are also several ethical concerns, especially in the academic sphere, about ChatGPT and other AI-powered chatbots (e.g. Amin, 2023). The generated output is based on existing texts, but usually lacks proper citation. If given, the sources are often incorrect or non-existing (Kohnke et al., 2023; Schmied & Ivanova, 2023, p. v). Hence, the question arises whether the utilization of ChatGPT constitutes academic fraud or contributes to academic dishonesty. In particular, copied passages from chatbots could be classified as plagiarism (cf. Cotton et al., 2023, pp. 1, 3; Kohnke et al., 2023, p. 8; Qureshi, 2023, p. 1; Schmied & Ivanova, 2023, p. v). On the other hand, the output from ChatGPT usually is not a direct copy from the original texts on which it has been trained. It is thus a borderline case that has not previously been captured by definitions of plagiarism, but which seems to be located in a grey zone of academic misconduct. Recent improvements, e.g. through Bing.ai search (Microsoft Copilot) or Perplexity.ai, could, however, help to reduce the amount of improperly cited or uncited works. At any rate, if direct copies or paraphrases are utilized without an acknowledgment of the source, this would count as plagiarism (Kohnke et al., 2023, p. 8).

Another problem from an ethical perspective is the linguistic, cultural, ideological, and temporal bias of the database on which ChatGPT has been trained (Ray, 2023, p. 147). The majority of the data corpus consists of texts written in English, which were then translated into other languages (Kohnke et al., 2023, p. 9). In addition, the corpus mostly represents written language rather than spoken language (Kohnke et al., 2023, p. 9). These texts also tend to mirror a specific sociocultural stance and hence cannot be regarded as culturally neutral even though the very use of AI may imply such neutrality (Kohnke et al., 2023, p. 9). Additionally, it is also restricted in time since only a limited portion of all available texts have been fed into the database (Ray, 2023, p. 147). In particular, this refers to old texts as opposed very recent ones that are not yet part of the data corpus. Hence, even though ChatGPT has been trained on a massive database, it only provides a limited perspective of the existing multitude of texts and resources. Accordingly, chatbot responses may be influenced by a cultural bias present in the source texts and in the working of the algorithms, potentially impacting students from diverse cultural backgrounds in language education (Kohnke et al., 2023, p. 9). Moreover, due to its self-learning mechanism, the chatbot might reinforce these existing biases and stereotypes even further (cf. Amin, 2023, pp. 7, 11). Due to recurring associations, some topics might appear as trending, whereas less common perspectives could diminish, thus undermining innovation and creativity (cf. the novelty bias cited by Ray, 2023, pp. 147–148). For these and other reasons, “[t]eachers worry that students will become too reliant on the chatbot to generate ideas, questions, and conversation topics rather than thinking creatively and originally” (Brinegar, 2023, p. 228). For users, it would be important to consider these inherent biases (Qureshi, 2023, p. 6) and the resultant cultural appropriation as well as possible hegemony of particular writing styles and

worldviews (cf. Ray, 2023, pp. 147–148). The effectiveness of chatbots in education thus heavily depends on the quality and quantity of information and knowledge included, necessitating an effective data collection mechanism (Chang et al., 2022, p. 17; Kuhail et al., 2023). Crucially, users need to be aware of these limitations and develop strategies in handling them confidently (Aithal & Silver, 2023).

Furthermore, there are potential risks related to privacy and data security when using chatbots, which raises additional ethical concerns (Adamopoulou & Moussiades, 2020, p. 13; Grassini, 2023, p. 7; Ray, 2023, p. 141). They pertain to the compilation of data for the AI system, notably the collection of user data, as well as an unequal access to AI technologies resulting from differences in the free and premium versions that require subscription (cf. Amin, 2023, p. 7).

4.4. Novelty Effects and Other Affective Factors

As with any unprecedented technology, the use of chatbots may cause novelty effects, which makes them an attractive feedback companion upon initial exploration, but might make users lose interest over time (Fryer et al., 2020, p. 16; Li et al., 2023, p. 38; Yin et al., 2021, quoted by Zhang et al., 2023, p. 13). Learners' motivation and engagement may decrease further (Kuhail et al., 2023, p. 1005) as soon as they become aware of the limitations of the chatbot. For example, they might realize that “chatbots are often unable to answer complex or unexpected questions [...] and produce inappropriate dialogue flows”, which can lead to frustration (Mageira et al., 2022, p. 3) or even faulty knowledge acquisition.

Overall, chatbot communication may feel inauthentic and unreliable, as it often lacks the empathetic qualities of human-human interaction (Adamopoulou & Moussiades, 2020, p. 1; Li et al., 2023, p. 38; cf. the review by Zhang et al., 2023, p. 13). Some chatbots are perceived as predictable and redundant, with a limited ability to memorize previous conversations, leading to repetitive interactions and user frustration (Mageira et al., 2022, p. 3). For instance, ChatGPT responses often follow the same standard pattern (introduction, main part, conclusion) and utilize similar formulations. This can result in boredom and also have an impact on the way the feedback is perceived and used (cf. Adamopoulou & Moussiades, 2020, p. 1; Dai et al., 2023b; Fryer et al., 2017, p. 463). However, it is also possible to customize the output to a certain extent, as described in section 5.3 below.

Due to the still-prevailing lack of emotional intelligence (see the review by Grassini, 2023, p. 6), chatbots are not capable of understanding or empathizing with a user's emotional state, which, however, is important for feedback uptake. In fact, the long-term learning gain with chatbots has not been extensively studied, and comparisons with traditional non-intelligent systems are scarce (Ruan et al., 2021, p. 435).

4.5. Costs and Server Capacity

Qualitatively better chatbots (or premium versions, including ChatGPT) come with additional costs (cf. Kohnke et al., 2023, p. 2). Lower-performing language models may also suffer more often from server overload or slower loading times. The question of access and availability can also be regarded as another ethical issue in addition to the other

points that were listed above. The “most capable model”, as stated on the ChatGPT-4 website in 2023, is currently only available to paying users. Such a distinction between paid and free versions certainly puts individuals and countries with a low economic status at disadvantage.

Another area of concern relates to the energy consumption resulting from the enormous computing resources that are needed to create and sustain an AI system (Ray, 2023, p. 141). These, in turn, can have negative effects on the environment (Ray, 2023, p. 141).

4.6. Skills Required

Implementing chatbots for specific teaching and learning needs requires a high level of experience and skills, which may be a hurdle for educators (Wollny et al., 2021, p. 12) and learners (Woo et al., 2023). For instance, in the study by Woo et al. (2023), the “[s]tudents reported high cognitive load” when using the chatbot, especially to formulate adequate prompts (preprint p. 3). Also, the development of critical thinking and problem-solving skills presents a challenge, given that chatbots fulfill an increasingly sophisticated range of functions. Therefore, the following section will give advice about the implementation of chatbot feedback in educational contexts.

5. Suggestions for Implementation

The present section will outline important preconditions as well as suggestions for using chatbots for self-feedback, assessment, and feedback training.

5.1. Required Equipment and Competencies

Chatbots can be used on tablets, laptops, desktop PCs and mobile phones. The free version of ChatGPT can be accessed at <https://chat.openai.com/>, whereas the premium version comes with additional costs. Other AI chatbots are Google Gemini (<https://gemini.google.com/app>), Bing AI (Microsoft Copilot), Perplexity AI (<https://www.perplexity.ai>) and several others.

Crucially, a pedagogically valuable as well ethical use of chatbots for feedback purposes requires an array of competences from the users, i.e. teachers and learners (Kohnke et al., 2023, p. 10). In their article, Kohnke et al. (2023) discuss several dimensions of digital competence that appear to be needed for using ChatGPT. This involves awareness of the features and of the limitations of ChatGPT (see sections 3 and 4; cf. Javier & Moorhouse, 2023, p. 1) and staying up-to-date with regard to the newest changes (Kohnke et al., 2023, p. 10). An understanding of the underlying mechanisms of the chatbot is also beneficial for becoming critically aware of its biases and the risks involved in its usage (Javier & Moorhouse, 2023, p. 1; Kohnke et al., 2023, p. 10).

Moreover, educational institutions should set up clear “guidelines for using such tools, modify their teaching and assessment practices, and consider how to best prepare students for a world where AI-driven digital tools are a normal part of daily life” (Kohnke et al., 2023, p. 10). Hence, AI tools cannot or should not be ignored, but a safe and ethical

use of the tools should be practiced (Kohnke et al., 2023, p. 10). Learners' attention should be drawn to legitimate resources and tools for working on their assignments (Qureshi, 2023, pp. 6–7) as well as to the concept and consequences of plagiarism (Cotton et al., 2023, p. 3; Qureshi, 2023, pp. 7–8). In addition, they could discuss strategies that help them verify the suggestions and identify incorrect information of chatbot-generated output (Qureshi, 2023, p. 1). In that respect, teachers could demonstrate and practice the utilization of chatbots and other resources together with the students while closely monitoring learners' usage of these tools (Qureshi, 2023, p. 7). Overall, an iterative and scaffolded approach to utilizing AI chatbots is recommended for sensitizing students to their responsible use (cf. Javier & Moorhouse, 2023).

To pre-empt an overuse of AI tools, educators should develop tasks that cannot easily be solved by a bot (Cotton et al., 2023, p. 3) and which alert students to existing limitations and dangers. This includes assignments that require students' own creative and "critical thinking, problem-solving, and communication skills" (Cotton et al., 2023, p. 5), e.g. through specific real-world projects that are solved in a team. Furthermore, continuous guidance through in-process feedback conversations based on regular draft submissions helps to ensure that students craft their works on their own and have understood the underlying notions. In that respect, regular in-process discussions and follow-up interviews can prove helpful (cf. Qureshi, 2023, p. 7). Hence, a combination of different assessment techniques and feedback channels is recommended (Cotton et al., 2023, p. 3; Qureshi, 2023, p. 7). In that respect, peer approaches appear promising in which students explore AI tools collaboratively within the protected space of the classroom. In the end, students will not always be able to rely on chatbots, especially when engaging in face-to-face conversations that require immediate answers and social skills.

For this, feedback skills and teamwork skills play a central role. Learners should thus be made aware of the importance of feedback as well as of their agentive role in the feedback process (see section 2). Indeed, the utilization of ChatGPT could promote students' agency at different phases of the feedback process and in different situations and modalities, as will be discussed further below. Moreover, it can aid teachers' feedback and learners' self-correction process, as will be shown next.

5.2. Formulation of Prompts

Apart from a critical analysis of the generated output, the usefulness of ChatGPT depends on the input that the users provide to the system (Schmied, 2023, p. 11). Notably, an adequate formulation of prompts plays a vital role (Javier & Moorhouse, 2023, pp. 2–4; Qureshi, 2023, p. 6; Schmied, 2023, p. 8; Woo et al., 2023, preprint p. 8). These prompts should be clear and specific and provide sufficient contextual information (Ray, 2023, p. 126). Consequently, the successful use of ChatGPT for feedback purposes hinges "on the quality of the questions" (Kohnke et al., 2023, p. 8), together with an awareness of relevant assessment criteria (desired output). Both of them are important components of feedback literacy, which means that practicing the provision of prompts can help students to develop this capacity. For example, during feedback training (see also section 5.5 below), students could create an assessment rubric together with the teacher, apply it, and evaluate the resultant chatbot output. However, depending on the specificity

and complexity of the assignment, learners might notice the limitations of the system. Accordingly, they might try out different prompts, ask ChatGPT to help them improve the prompts they have entered, or even prompt ChatGPT to produce suitable prompts (cf. Gharani, 2023). One common strategy in that regard is “iterative prompting” (Ray, 2023, p. 126). This means that users continuously refine the prompt or divide it into sub-questions to obtain the desired guidance (see also Woo, 2023, and Woo et al., 2023, about the iterative process of chatbot interactions and prompt engineering). These specific feedback requests might refer to grammar, spelling, pronunciation (Frackiewicz, 2023), source use, paragraph structure, and style. Escalante et al. (2023), for instance, prepared a set of prompts pertaining to different assessment criteria, such as “Using simple language, examine the use of transitional phrases in the paragraph. Are they appropriate for academic writing? How could they be improved? Start your feedback with [...]” (p. 16).

Likewise, teachers can ask ChatGPT to generate an assessment rubric for a specific assignment. The results could be compared to the rubric that has been co-created with the students, leading to potential modifications or evidencing the system’s limitations. The finalized rubric can then be fed into ChatGPT again and applied to student work (Cotton et al., 2023, p. 3). As Dai et al. (2023b) showed, there are benefits and drawbacks to such a procedure. Similarly, learners are likely to experience affordances and challenges when utilizing ChatGPT for the purpose of self-feedback, to which we will turn next.

5.3. Implementation of ChatGPT for Self-Feedback

To utilize ChatGPT for self-feedback, learners should first reflect on their work’s strengths and areas of difficulty themselves. For this, teachers could provide learners with reflective questions (cf. chapter 2 on course re-design by Schluer in this volume), such as

- What do you think are the strongest aspects of your assignment? OR: What are the areas you feel confident about in your assignment?
- What areas of your assignment do you think need to be improved? OR: What are the areas you are unsure of in your assignment?
- I would particularly like feedback on (list up to three specific areas): ...

These are self-reflective questions that students were asked to attach to their draft submissions in some of my classes (as inspired by Winstone & Carless, 2020, pp. 108, 110; see also Schluer, 2022, pp. 37, 42–43).

In a subsequent step, they should go to the ChatGPT platform (or another generative AI tool), sign up and log in, respectively (see also the information about chatbot feedback on the “Digital Feedback Map” by Schluer, 2023). Next, they need to create a prompt that instructs ChatGPT on the specific assignment and the type of feedback that they desire (see above). For example, learners could use a prompt like: “Please review the attached essay and provide constructive feedback on its structure, clarity, and overall coherence.” For this, students need to upload or copy-paste their writing assignment into the ChatGPT platform. They need to ensure that the document is well-formatted and legible for the AI to process it accurately.

Afterwards, they should closely analyze the ChatGPT output. For example, the users might notice that the responses are too elaborate or too general and unrelated to their needs. To overcome this, there are at least four options. Since ChatGPT has been designed for back-and-forth conversations, (1) users can interact with it to ask clarifying questions or request more detailed feedback (Kohnke et al., 2023; see also Abdelhalim, 2024, p. 9). To give an example:

User: “Could you focus on the essay’s introduction and provide suggestions for improvement?”

ChatGPT: “Certainly! The introduction could be made more engaging by ...”

Learners should continue to review the feedback provided by ChatGPT and consider its suggestions. They may also (2) try out the feature for regenerating the response in order to compare it to the previous one. If the feedback still differs from what they expect, they could (3) rephrase the prompt in a clearer and more specific way (Kohnke et al., 2023, p. 8). Indeed, ChatGPT often simply needs sufficient information to produce responses that are tailored to the user’s needs. To avoid repeating the same background information in every single prompt, users can benefit from (4) the feature called “custom instructions” that can be found in the user settings since summer 2023 (OpenAI announcement July 20, 2023, at <https://openai.com/blog/custom-instructions-for-chatgpt>; cf. Gharani, 2023). Two text fields will appear in which users can characterize their own background (“What would you like ChatGPT to know about you to provide better responses?”) and expectations (“How would you like ChatGPT to respond?”). To exemplify, they could write that they are university students and expect responses to be written in a succinct academic style. They might also specify whether they prefer feedback written in a direct style which focuses on constructive critique rather than praise. In that respect, they could even describe a persona (e.g. historical figure) whose rhetorical style should be imitated in the chatbot replies (Kostka & Toncelli, 2023, p. 2).

Users can experiment with the level of detail they provide in these fields to evaluate their impact on the responses that ChatGPT provides. Otherwise, it will produce generic responses that follow a standard pattern which might not comply with the user’s needs. If users are not sure what their own (or expected) writing style is, they could also feed in good examples of their desired output (e.g. previous texts they have produced) and ask ChatGPT to define it and use it in its answers (Gharani, 2023).

If this customization does not help, unsatisfactory replies might evidence its true limitations. Certainly, the AI-generated feedback is not perfect (Dai et al., 2023b; Fryer et al., 2017, p. 463), which is why learners should utilize their own critical judgment to assess the quality of the recommendations (Haristiani, 2019). For example, Li et al. (2023) underscore the importance of comparing the ChatGPT corrections with users’ own drafts and of giving reasons for why they will (not) use certain suggestions (p. 45). Users also should not hesitate to incorporate their own ideas and perspectives (Cotton et al., 2023, p. 7) that go beyond or could even contradict the generated feedback. To verify the AI suggestions and back up their own ideas, they should consult reliable external sources (e.g. online dictionaries, grammar books, literature databases). To some extent, they can also ask the AI bot to provide further explanations (Li et al., 2023, pp. 45–46). Quite of-

ten, however, ChatGPT even reminds the users of its own limitations. For instance, when asked to explain in how far ChatGPT might be useful for self-assessment (on February 07, 2023), ChatGPT replied that

“[...] it’s important to note that the accuracy and effectiveness of language models for self-assessment will depend on the quality and comprehensiveness of the training data, as well as the specific task and context. Further research is needed to fully understand the capabilities and limitations of language models in this area.” (OpenAI, 2023c)

Hence, it is essential to keep in mind that AI-generated feedback should not be a substitute for the instructor’s expertise and guidance (Mageira et al., 2022). Rather, it should be employed in conjunction with instructor assessment to achieve a better learning gain. However, to some extent, the provided feedback can be beneficial, for example for minor revisions as well as for developing an action plan. Often, ChatGPT suggests several strategies for what learners could do in order to improve further. By checking the suggestions and consulting additional resources, they can fine-tune the action plan and implement it step-by-step as well as discuss it with their teacher if needed.

5.4. Combination of ChatGPT with Peer Feedback and Teacher Guidance

As indicated above, chatbot feedback should be used in combination with other information sources, including the reading of relevant literature as well as human feedback from peers or teachers (see e.g. Escalante et al., 2023, p. 13; Li et al., 2023, pp. 45–48; cf. the review by Wahyudi, 2023, p. 2). Several scholars therefore argue for “a mixed approach” (Escalante et al., 2023, p. 13) that “strik[es] a balance between AI-assisted innovation and human expertise” (Ray, 2023, p. 121).

Overall, there are many possible ways in which technology-generated and human feedback can be combined in the classroom. For instance, students could engage in peer feedback activities first and then compare or enrich their assessment with the help of AI. Through such comparisons, they might become aware of the benefits and limitations of chatbots. To encourage (meta-)cognitive engagement and critical thinking, the utilization of a “feedback tracker sheet” (in analogy to Gießler’s [2024] change tracker sheet for AWE feedback) may prove valuable. Therein, learners can collect the feedback comments they have received from both sources (peers and chatbots), note down the explanations they have obtained (if available), indicate whether or in how far they will consider them in their further learning or in their draft revisions as well as provide reasons for (not) using them. At this point, they can engage in follow-up dialogues with the chatbot (Li et al., 2023, p. 45) and the peers or the teacher to clarify or deepen their understanding. This way, students might become aware of the chatbot’s limitations and the importance of “double-checking the correctness and accuracy of provided resources and citations” as well as of “approach[ing] them [the given responses] with a critical reading mindset” (students cited in Abdelhalim, 2024, p. 9). Accordingly, teachers should provide students with sufficient “opportunities [...] to discuss AI-generated feedback [...] and ask follow up questions” (Escalante et al., 2023, p. 13).

In fact, pedagogical guidance is crucial at any stage of the AI-supported feedback process. Teachers should therefore offer manifold scaffolded activities to foster critical thinking (Abdelhalim, 2024, p. 10) but also to manage emotions and develop interpersonal skills in human interactions. Not only should the utilization of chatbot feedback be addressed in the classroom, but their potential to develop students' feedback literacies can be profitable in additional ways, as will be discussed below.

5.5. Utilization of ChatGPT for Feedback Training

Apart from prompting ChatGPT to correct sentences or provide feedback on a draft, the capacities of AI bots can be exploited for feedback training and the development of learners' and (pre-service) teachers' feedback literacy. As delineated above (in section 2), feedback literacy involves the ability to request feedback, provide feedback and utilize the received feedback as well as to engage in follow-up feedback dialogues (Carless & Boud, 2018, pp. 1316–1317). While the reception and use of feedback has been explored above, the initiation, provision and follow-up conversation will be focused on in the present section.

Here is an example of a feedback conversation that was generated by ChatGPT (OpenAI, 2023a, August 04, 2023, 10:15 AM CEST):

Prompt: Can you give me an example of a feedback conversation in the context of learning English as a foreign language? The example should demonstrate the active role that learners play throughout the feedback process, starting with a request for feedback.

ChatGPT: Of course, I'd be happy to provide an example feedback conversation in the context of learning English as a foreign language:

Learner (Maria): Hi there, I hope you're doing well. I've been working hard on improving my English speaking skills, and I recently recorded myself having a conversation about a random topic. Would you be willing to listen to it and give me some feedback?

Peer (John): Hi Maria! I'd be glad to help. That's a great initiative! You can send me the recording, and I'll listen to it carefully.

Learner (Maria): Thank you so much, John! I really appreciate it. Here's the recording: [attaches recording]. I'm particularly focusing on my pronunciation and fluency.

Peer (John): I've listened to your recording, Maria. Overall, you're doing a fantastic job! Your pronunciation has improved a lot since the last time I heard you. Your speech is clear and easy to understand. One thing I noticed is that your fluency is quite good, but there were a few moments where you hesitated or repeated some words. To work on this, you might want to practice more free-flowing conversations or try some tongue twisters to improve your speech rhythm.

Learner (Maria): Thank you, John! I'm glad to hear that my pronunciation is better. I'll definitely take your advice to heart regarding fluency. Do you think you could point out those specific parts where I hesitated or repeated? That would be really helpful.

Peer (John): Of course, Maria! Let me give you some timestamps and examples. Around the 2-minute mark, you hesitated slightly when transitioning to a new idea. Instead of saying "um," you could have used filler phrases like "well," or "you know." Also, at around 4 minutes, you repeated the word "interesting" a couple of times.

Maybe you can explore synonyms like “fascinating” or “captivating” to add variety to your speech.

Learner (Maria): Thank you for the detailed feedback, John! I’ll go back to those parts and practice more. Your suggestions make a lot of sense, and I’m excited to work on these areas.

Peer (John): You’re welcome, Maria! I’m glad I could help. Remember, learning a new language takes time and practice, so don’t be too hard on yourself. Keep up the good work, and I’m here anytime you need more feedback or just want to practice a conversation.

Learner (Maria): I really appreciate your support, John. Having a peer like you to give me feedback and encourage me is invaluable. I’ll definitely reach out again soon. Thanks once again!

Peer (John): No problem at all, Maria! I’m here to help. Looking forward to our next feedback session. Keep up the great work, and take care!

Directly below this example, ChatGPT gives the following explanations that illuminate central characteristics of feedback dialogues:

“In this example, Maria takes an active role in seeking feedback, provides context about her learning goals, and engages in a meaningful dialogue with her peer, John. The conversation demonstrates a constructive feedback process where Maria’s strengths are highlighted, areas for improvement are pointed out, and specific suggestions are given. Maria actively seeks clarification on feedback and expresses gratitude, creating a positive and supportive learning environment.” (OpenAI, 2023a)

The output was generated within seconds, together with the explanation of what is going on. It illustrates a potential peer feedback exchange between learners of English.

In addition, it is possible to “adjust the complexity of the dialogue to make it more suitable for beginners or advanced learners” (Kohnke et al., 2023, p. 4) or for specific contexts. Here is another example of a sample feedback exchange prompted in ChatGPT 3.5 on August 04, 2023, 10:22 AM CEST (OpenAI, 2023a):

Prompt: Thank you. Can you give me an example of a written feedback exchange between a learner of English as a foreign language and her teacher? The example should come from a university context. The learner intends to become a teacher of English herself. She is at advanced level already and has composed a research proposal for examining students’ perceptions of different accents in English.

ChatGPT: Certainly! Here’s an example of a written feedback exchange between a university student (Learner) and her English as a foreign language teacher (Teacher) in the context of a research proposal:

Subject: Request for Feedback on Research Proposal

Learner (Maria): Dear Professor [Teacher’s Last Name],
I hope this message finds you well. I have been working on my research proposal and I would greatly appreciate your feedback before I finalize and submit it. As an aspiring English teacher, I am particularly interested in examining students’ perceptions of

different accents in English and how it might influence their language learning experience.

I have attached the draft of my research proposal to this email. I am particularly concerned about the clarity of my research questions and the overall structure of the proposal. Any guidance you can provide would be immensely valuable to me. Thank you in advance for your time and support.

Best regards, Maria

Teacher (Professor Smith): Dear Maria,

I hope you're doing well. I'm glad to see your enthusiasm for your research proposal. It's an interesting and relevant topic, especially considering your future goals. I've reviewed your draft, and I'm impressed with the depth of your understanding and your well-defined research questions. Your passion for becoming an English teacher shines through in your writing.

In terms of structure, your introduction sets the stage effectively by highlighting the importance of accents in language learning. However, I'd suggest adding a brief literature review to provide context for your research questions and demonstrate your awareness of existing studies in this area.

Your methodology section is well thought out, and your choice of qualitative interviews to gather students' perceptions is appropriate. Make sure to detail the process of participant selection and ethical considerations more comprehensively.

Regarding your research questions, they are clear and focused. To enhance them further, consider embedding the rationale for each question within its description. This will help your readers understand the significance of each question in relation to your overall study.

Overall, you're on the right track. Make the suggested revisions, and I believe your proposal will be even stronger. Feel free to reach out if you have any questions or need further assistance. Keep up the good work!

Best regards, Professor Smith

Learner (Maria): Dear Professor Smith,

Thank you so much for your prompt and thorough feedback. I truly appreciate your insights and guidance. I will certainly revise the proposal to incorporate the changes you've suggested. Your idea about including a literature review makes a lot of sense, and I will make sure to provide a more detailed explanation of the participant selection process and ethical considerations.

I'm grateful for your encouragement and support as I work towards refining my research proposal. I will keep you updated on my progress, and I look forward to your continued mentorship.

Best regards, Maria

In this written feedback exchange, the learner, Maria, seeks guidance and feedback from her teacher, Professor Smith, on her research proposal. The teacher provides detailed feedback, highlighting both the strengths of the proposal and areas for improvement. The exchange demonstrates a respectful and collaborative learning environment in a university context, where the learner actively engages with the feedback and expresses gratitude for the teacher's guidance.

The second example represents a teacher-student feedback dialogue and could prove useful for the training of teachers' and learners' feedback literacy alike. Based on these

and further feedback samples, pre-service teachers might be asked to identify central characteristics of feedback exchanges and suggest alternative variants. However, they also need to become aware of the potential cultural bias that is inherent in these examples: The professor and the feedback-giving peer are male and have stereotypical English (British or US) names (Professor Smith and John, respectively). Moreover, a repeated use of the same standard formulations and structures may also leave a negative impact on the students, once they recognize that the feedback comes from a template and is not specific enough. Likewise, students need to be taught that an over-reliance on chatbot-generated feedback requests and replies might diminish their own critical thinking skills and could be identified by their teachers. Similarly, chatbot-generated writing can be detected to some extent by teachers or specialized software. To pre-empt such cheating and over-reliance on AI programs, educators can resort to the strategies that are sketched below.

5.6. Further Advice for Teachers

Beyond the precautionary measures mentioned above, there are some further techniques that teachers could take in order to detect an illegitimate use of chatbots. As the generated output often adopts similar phrases and structures (Cotton et al., 2023, p. 5), teachers might notice learners' use of AI, especially when it contrasts with students' previous linguistic performance. This becomes even more evident when there are obvious differences in language use within the same assignment (Cotton et al., 2023, p. 4). Moreover, the non-citation of sources or the types of sources cited provide important clues. So far, several chatbots are not yet able to reliably incorporate references (Cotton et al., 2023, p. 4). Even more so, the range of available sources is limited and might not comply with the literature list that was used in class or that was recommended by the instructor. As Cotton et al. (2023) note, "human writing tends to be more contextually aware and responsive to the needs of the audience, while writing generated by AI may be more generic and less tailored to a specific context" (p. 5). There could even be factual errors in the writing when the content was produced by a machine (Cotton et al., 2023, p. 5). While some plagiarism detection tools might be able to identify AI language to a certain extent (Cotton et al., 2023, p. 5; Qureshi, 2023, p. 7), they do not work reliably throughout. Human expertise and strategies to verify the correctness of the contents are therefore essential.

6. Discussion

Chatbots fulfill an increasing range of functions as learning, teaching and feedback assistants in educational contexts and beyond (cf. e.g. Essel et al., 2022, p. 2). Due to their prevailing limitations and the importance of critical and creative thinking as well as social interaction skills, AI-powered chatbots should at present merely be considered as a supplement to feedback exchanges between humans (cf. Escalante et al., 2023, p. 13; Qureshi, 2023, p. 3; Ray, 2023, p. 121). It is to be seen in how far they will become an integral part of teaching and learning in the future. To some extent, AI systems can already be a useful guide for the training of feedback literacies as well as for self-assessment, corrections, and grading.

More precisely, AI-powered engines like ChatGPT can be very helpful in generating specific feedback requests, checking grammar, providing recommendations for improvement, and giving positive, constructive and action-oriented feedback to learners. Especially the given explanations for both negative and positive feedback may help users understand the reasons behind their errors or successes, which can improve their language awareness and self-directed learning. At the same time, critical language awareness and analytical skills are needed to check the generated suggestions, formulations and structures. In that respect, the consultation of additional resources for learning and teaching is indispensable, particularly since several studies have observed a high amount of false information and fictional references.

Through an advanced training of chatbots, though, it might become possible to produce real-time, personalized, context-specific and natural-sounding responses more reliably. This can also allow “educators [to] provide personalized feedback of consistently high quality for a larger scale of class in less time” (Dai et al., 2023b, p. 5). Likewise, ChatGPT’s ability to provide personalized, immediate, non-judgmental, and multilingual feedback can make it a powerful asset for language learners seeking to improve their communication skills. Their motivation and engagement in enhancing their skills continuously can increase further if the use of chatbots occurs as guided practice in teaching settings. Through pedagogical integration, it will also become easier to cater for individual needs and learning preferences, foster active learning, decision-making, and problem-solving skills. The combination of personalized assistance and feedback by humans and AI bots can eventually contribute to improved learning achievement and self-efficacy (Essel et al., 2022, pp. 4, 12) and boost students’ confidence in their language skills (cf. Chang et al., 2022; Fryer et al., 2020, p. 16, referring to Fryer & Carpenter, 2006).

With advancements in AI, it might even become easier for educational institutions to create their own chatbots for specific needs (Essel et al., 2022, p. 2), as some universities have done already. Moreover, there are numerous apps and extensions that draw on AI. The language learning app Duolingo, for instance, makes use of GPT-4 (Frackiewicz, 2023). It is likely that technological improvements will further enhance feedback processes in the future by moving beyond simple corrective feedback. One critical and highly debated area for future research is the emotional sensitivity of AI-generated feedback, including non-verbal ways of emotional reactions (cf. Fryer et al., 2020, p. 15). On the one hand, this could have affective benefits; on the other hand, it would blur the boundaries between humans and technologies even further, making them less distinguishable from each other. This could be perceived as dangerous, especially with respect to the development of interpersonal skills.

Other attempts at improvement relate to the incorporation of sources to the bot output. For example, the chatbot Perplexity.ai (<https://www.perplexity.ai/>) lists sources together with the bot answers, even when not explicitly asked for. Several of them indeed lead to existing websites, whereas some others seem non-existent or at least inaccessible. However, these sources are not embedded within the running text, but given in a separate section (i.e. in-text citations are missing). Aside from that, several extensions are being developed, including voice communication (e.g. Talk to ChatGPT) and video sum-

maries (e.g. YouTube Summary with ChatGPT), which could enhance the (multimodal) feedback process further.

Overall, it is important for users to continuously examine these developments critically in order to exploit their potentials effectively while being aware of their limitations. The aim of the present chapter was to make a contribution to this highly dynamic and promising field. Naturally, some of the limitations might have become obsolete in the years following this publication, which is in line with the idea of dynamic feedback literacy development (Schluer, 2022, p. 238). Both teachers and learners need manifold and agile skills for using and critically inspecting technological developments (Schluer, 2022, pp. 238–249).

Generally, these developments cannot be fully ignored to prepare students for real-life workplace contexts which progressively draw on new technologies for an increasing number of tasks (Schmied, 2023, pp. 12–13). In sum, then, guided practice within educational contexts would be a recommended. Educators should offer an open-minded but critical stance (Schmied & Ivanova, 2023, p. vi) whilst exploring and discussing the affordances and dangers of AI, as well as use a meaningful combination of manual and automated feedback methods (Cotton et al., 2023, p. 3).

7. Conclusion

This chapter has reviewed several challenges and affordances of chatbots with an emphasis on enhancing feedback processes in educational settings. This includes using chatbots as facilitators of self-feedback among learners, of feedback processes by teachers, and as inspirations for initiating and continuing feedback conversations in the classroom.

With chatbot systems undergoing constant transformation, their impact on the learning and teaching experience needs to be inspected continuously and critically. Together with their students, teachers should openly discuss these developments to avoid an illegitimate use of the AI-powered tools (see also closing chapter 17 by Schluer in this volume). Moreover, it is crucial to combine chatbot-generated feedback with other feedback methods, such as teacher feedback or peer feedback in various written, oral and multimodal ways in face-to-face, online and hybrid learning constellations. To choose an adequate feedback method, the primary impetus should always be the intended learning objective (as reviewed by Schluer, 2022, pp. 53–54). For each feedback mode and tool, then, specific training will be required for teachers and learners alike. In that respect, there is still lots of underexplored territory from an empirical and pedagogical perspective. It is hoped that the present contribution will give inspirations for future research and teaching practice concerning a pedagogically sound use of chatbot feedback.

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AI Avenues for Future Research and Teaching Practice on Digital Feedback

Jennifer Schluer

Abstract *Recent developments in the field of Artificial Intelligence (AI) have sparked vivid debates in academic discourse and teacher education. To promote a responsible and critical use of AI in education and other areas of life, AI literacy needs to be cultivated among teachers and students. Extending the discourse from the foregoing contributions, this closing chapter explores additional AI avenues for digital feedback, including the assessment of speaking skills, text comprehension, presentations, lesson planning, and teaching performance. Despite ongoing progress, challenges persist, which might be overcome through future work. The chapter therefore not only reviews current affordances and limitations, but concludes by offering suggestions for future research and teaching practice to further seize the potentials of AI for feedback purposes.*

Keywords *artificial intelligence; digital feedback; AI literacy; technology-generated feedback; generative AI*

1. Introduction

The past years have witnessed rapid developments in the field of Artificial Intelligence (AI), which seem to “revolutioniz[e] the realm of education” (Fakher Ajabshir, 2023, p. 107). Especially since the public release of ChatGPT in November 2022, numerous new tools and features have been launched, with progressive improvements to overcome existing weaknesses and limitations. Even though the writing of this book spanned only one year, the evolution has been remarkable, leading to continuous updates of several chapters, notably those on chatbots (chapter 16 by Schluer in this volume) and the present one on additional AI applications. It is likewise possible that several further challenges described in this book will have been solved already when you open this book on your screen or hold it in your hands.

As I had already emphasized in my 2022 book on *Digital Feedback Methods*, “digital developments are dynamic and ongoing” (Schluer, 2022, p. 11) and therefore also the present book merely represents a snapshot of the field. Overall, it serves as an updated comple-

ment to the 2022 book in which I described fifteen digital feedback methods based on existing research papers and teaching practices. They have meanwhile grown to nineteen, as shown on the *Digital Feedback Map* (Schluer, 2023), which can be consulted as a dynamic resource for ongoing developments in the area of digital feedback.

To pave the way for future research and teaching practice, this edited volume contains findings from recent research projects as well as several ideas for incorporating digital feedback in teaching and teacher education. This closing chapter therefore explores some additional avenues of AI usage for feedback purposes. Examples include AI feedback on speaking skills and text comprehension, presentations, lesson planning, and teaching performance. It will also discuss still-prevailing limitations and close with suggestions for future research and teaching practice in the field of digital feedback.

2. Review of AI Affordances and Limitations for Feedback Purposes

2.1. Definition of AI

Originally coined by John McCarthy in 1956, Artificial Intelligence (AI) denotes the science and engineering of creating intelligent machines and computer programs that emulate human behavior and thinking (Stanford University, n.d., para. 2, quoted by Moya & Eaton, 2023, p. 3; see also Iftanti et al., 2023, p. 457; Dogidovic, 2007, p. 100, cited in Zawacki-Richter et al., 2019, p. 10). AI nowadays serves as an umbrella term that encompasses an increasingly growing range of technologies, including natural language processing (NLP), machine learning, neural networks and algorithms (as reviewed by Zawacki-Richter et al., 2019, p. 3). It has given rise to various applications, such as speech recognition systems, automatic writing evaluation (AWE), computerized dynamic assessments or learning analytics as well as chatbots and other virtual tutors or virtual realities (Fakher Ajabshir, 2023).

Accordingly, AI plays an increasingly important role in education (Chen et al., 2020), not the least due to its easier availability since the public launch of ChatGPT (see chapter 16 on chatbots by Schluer in this volume). In that respect, AI tools are often clustered into learner-facing, teacher-facing, or system-facing technologies (Baker & Smith, 2019, pp. 11–14, also cited by Zawacki-Richter et al., 2019, p. 4; see also Rudolph et al., 2023, pp. 350–352). The three terms already hint at the main user groups of these AI tools: Learner-facing AI tools are targeted at learners and offer personalized and adaptive support, such as through intelligent tutoring systems (Baker & Smith, 2019, p. 11). Teacher-facing tools, in turn, are targeted at teachers by providing them with data about students' progress and by automating tasks related to assessment and plagiarism detection, for instance (Baker & Smith, 2019, pp. 12–13). Finally, system-facing AI are intended to support administrative decision-making across courses or institutions (see Baker & Smith, 2019, p. 14).

With regard to assessment and evaluation, Bond et al. (2023) categorized AI support into six subgroups: (1) “the evaluation of student understanding, engagement, and academic integrity”, (2) “automated grading and online exams”, (3) “automated feedback”, (4) “evaluation of teaching”, (5) “evaluation of learning material”, and (6) “the evaluation of

universities” (preprint p. 24). Thereby, most prior work focused on written assignments, with AI systems offering feedback to the learner, or the teacher using AI technologies to provide feedback to the learner. This contribution, however, explores further avenues in which AI might empower learners and teachers regarding a larger variety of tasks. Beforehand, commonly cited affordances and limitations of AI in education will be reviewed in the next sections.

2.2. Affordances

AI can facilitate feedback processes in various ways for both learners and teachers. One already established way to do so is through automated feedback systems which analyze student work and provide timely, personalized feedback (see e.g. the handbook by Shermis & Burstein, 2013). For example, automated essay scoring utilizes NLP techniques to assess the coherence, organization, and grammar of students’ essays (Fakher Ajabshir, 2023, p. 98). These systems allow students to understand their strengths and weaknesses and may thus foster continuous improvement. As AI systems have the capacity to learn from previous input and experiences, the feedback and learning support is highly customized (Hooda et al., 2022, p. 2). The language learning app Duolingo, for instance, adaptively adjusts content difficulty and sequence based on learners’ responses and offers tailored feedback to optimize learning outcomes. This adaptive and personalized approach ensures that students are appropriately challenged and receive relevant support.

Indeed, personalized learning was cited as the main advantage of AI in numerous studies (as reviewed by Bond et al., 2023, preprint p. 33). To elaborate, the top six benefits of AI in higher education were personalized learning, greater insight into student understanding, positive influence on learning outcomes, reduced planning and administration time for teachers, greater equity in education, precise assessment and feedback (Bond et al., 2023, preprint p. 28).

To exemplify, instructors can benefit from using AI-powered platforms and tools, e.g. Grammarly, PaperRater, and Turnitin, which help to streamline tasks such as feedback provision, plagiarism checks and grading (Chen et al., 2020; Zawacki-Richter et al., 2019, p. 4). This not only results in reduced paperwork and workload for instructors (cf. Baker & Smith, 2019, p. 15; Zawacki-Richter et al., 2019, p. 4), but also empowers them to devote more attention to their core duties, such as teaching, curriculum (re-)design, and learner support. In that regard, teachers may also use AI to generate lesson plans and course materials, e.g. additional tasks for differentiated instruction to cater for various learner needs (cf. Baker & Smith, 2019, pp. 11, 16). For instance, texts and tasks could be adjusted to different educational contexts, proficiency levels, and learning paces (cf. Fakher Ajabshir, 2023, p. 97). Furthermore, AI can help to monitor student progress and evaluate it more precisely (Grassini, 2023, p. 3; Gutiérrez et al., 2022, as cited in Iftanti et al., 2023, p. 457). In that respect, learning analytics help educators to discern patterns and trends about students’ performance and progression as well as their own instructional effectiveness (Fakher Ajabshir, 2023, p. 100; cf. Hooda et al., 2022, p. 8). These insights should be utilized to inform targeted teaching interventions and enhance learning progress (Fakher Ajabshir, 2023, p. 100).

Furthermore, through chatbots and other AI tools, students can test their knowledge and train their competences autonomously, which may give them “a sense of control and ownership over their learning process” (Iftanti et al., 2023, p. 458). These applications offer manifold opportunities for language practice together with real-time responses and guidance for specific tasks and needs (Fakher Ajabshir, 2023, p. 96; Amin, 2023, p. 3; Iftanti et al., 2023, p. 456; Zawacki-Richter et al., 2019, p. 4). This way, AI tools can engage students in dialogues while providing scaffolded feedback and clarifications upon request (see chapter 16 by Schluer in this volume). The immediacy of the feedback can enhance the efficiency of the feedback loop. Moreover, the instant availability and resultant interactive (and often gamified) appeal of AI tools “can induce a state of flow in [...] learners” (Iftanti et al., 2023, p. 462), thus encouraging further learning.

2.3. Limitations

However, certain challenges and limitations still prevail. Notably, they encompass concerns about correctness, ethics and academic integrity, equity issues, data security and privacy, overreliance on AI as well as a variety of inherent biases (Amin, 2023, pp. 6, 11; Ray, 2023; Gültekin Talayhan & Babayiğit, 2023, pp. 84, 86).

Despite the increasing amount of input that AI systems can process, they often lack a thorough understanding of the underlying concepts that users want to learn about (cf. Grassini, 2023, p. 6). Additionally, challenges in understanding the “nuances of human language and emotions” can lead to “contextually inappropriate suggestions” (Gültekin Talayhan & Babayiğit, 2023, p. 86, citing Haleem et al., 2022). Hence, the explanations AI tools provide could be inadequate, incorrect and insufficiently tailored to the users’ individual needs and the misconceptions they might have (Grassini, 2023, p. 6). Also, the affective support of AI tools is limited, whereas human bonds in the classroom usually feel more genuine and motivating (cf. Kostka & Toncelli, 2023, p. 3).

Furthermore, there are concerns that AI may inadvertently promote dishonesty and threaten academic integrity (e.g. Crowe et al., cited by Chen et al., 2020, p. 75275). Educators also fear an overreliance on AI with severe consequences on learner autonomy and agency. Indeed, an excessive reliance on AI tools may hinder critical thinking, personal creativity, and the development of self-regulated learning skills among students (as reviewed by Gültekin Talayhan & Babayiğit, 2023, pp. 83, 86, 90).

Moreover, users are often concerned about data security and surveillance when AI tools are involved (Baker & Smith, 2019, p. 36). Financial constraints pose additional challenges to the widespread adoption of AI-based methods in education (Welham, 2008, p. 295, cited by Zawacki-Richter et al., 2019, p. 10). Further frequent drawbacks associated with AI in higher education are teachers’ lack of AI literacy, the shift in authority, and required changes in curriculum development (Bond et al., 2023, preprint p. 30).

Another critical aspect is that AI systems may not adequately represent cultural diversity (Jeon, 2021, cited by Fakher Ajabshir, 2023, p. 108) and could struggle to provide precise feedback for learners with “non-standard accents or speech patterns” (Fakher Ajabshir, 2023, p. 102). In fact, there are typically many inherent biases pertaining to the types of texts, gender, language variants, cultures and time periods on which an AI system is based (see Ray, 2023; see also chapter 16 by Schluer in this volume). Without suf-

efficient awareness and critical inquiry efforts, such stereotypes could be perpetuated or even reinforced. These challenges underscore the importance of an ethical AI usage as well as the need for an adequate infrastructure and teacher training (Bond et al., 2023, preprint p. 30).

However, with the quick progress that is made in the field of AI, several limitations might be overcome in the near future. So far, AI feedback already seems to work reliably for certain writing tasks (especially regarding grammar, punctuation and vocabulary), but there are also some promising developments for other skill areas, as will be reviewed below (section 3).

3. Implementation of AI Feedback for Learning and Teaching

So far, most of the existing literature focused on automated writing evaluation (AWE) and written corrections (see Schluer, 2022, pp. 78–91). However, there are also some promising future avenues for AI-powered feedback for a variety of skills, as will be outlined below.

3.1. AI Feedback on Writing

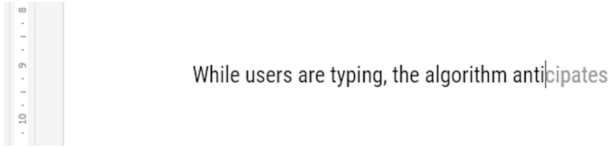
AWE utilizes NLP and AI to provide instant feedback on written compositions (Fakher Ajabshir, 2023, p. 98). Paired with critical reflection on the suggestions, it can be used by writers for self-assessment purposes (Gießler, 2024). While built-in spelling and grammar checkers in writing programs were highly error-prone in earlier years, there have been some noticeable improvements in recent years (Baker & Smith, 2019, p. 41; Schmidt & Strasser, 2022, p. 169). For instance, in writing programs such as Microsoft Word or Google Docs, users can obtain instantaneous suggestions to improve their written texts, including grammar and style (see Schluer, 2022, p. 82). As they type text, incorrect parts are underlined, and recommendations for improvement are shown as soon as users click on the words. An example from Google Docs is provided in Figure 1.

Figure 1: Text Corrections in Google Docs



Another feature that helps to craft texts and avoid spelling mistakes are “text predictions”, e.g. in Microsoft Word. While users are typing, the algorithm anticipates the next words or word parts, which users can readily accept by pressing the Tab or Right-Arrow key, or discard by simply typing something else. Figure 2 is a screenshot of the word part that was predicted when I wrote the foregoing sentence.

Figure 2: Text Predictions in Microsoft Word



However, at present, text predictions only work for a limited number of expressions, especially collocations and those phrases that writers recurrently use. It does not predict longer sentences or entire paragraphs. With this restriction, there is still enough freedom for a creative use of language.

For feedback that extends beyond the word and sentence level, generative technologies, such as OpenAI’s ChatGPT, can prove valuable (for details see chapter 16 on chatbots by Schluer in this volume). Users can type in a text and formulate a specific feedback request to obtain corrections or suggestions regarding grammar, word choice, coherence and conciseness (Kostka & Toncelli, 2023, p. 3). Moreover, generative AI technologies become increasingly “embedded in word processors and presentation software (e.g., Microsoft Co-Pilot)” (Moorhouse et al., 2023, p. 1). These developments are worth further observation and critical inspection in the near future.

At the time of writing this chapter, however, one of ChatGPT’s biggest limitations was the inexistent or faulty incorporation of sources. By contrast, Bing AI (Microsoft Copilot) or Perplexity AI (<https://www.perplexity.ai/>) might even assist students during literature searches (see also Schluer, in prep.). As soon as users send a command to the system, Perplexity AI links websites and PDF files as references for its output and as suggestions for further reading. The sources are referenced in the output text and users can easily verify the correctness and appropriateness by consulting the hyperlinked resources. Often, these sources stem from websites whose trustworthiness needs to be verified by the users through critical reading. In a pop-up window, then, users can remove non-fitting or irrelevant resources to enhance the quality of the text. Moreover, Perplexity AI provides possible follow-up questions below the generated text to solicit further details and fine-tune the text. Nevertheless, as the output from generative AI is based on computational models, it might not accurately represent the complexities and ambiguities of human language and communication.

For instance, even though DeepL appears to be one of the best-working AI assistants for writing and translations, the suggestions do not always sound fitting or contextually appropriate. For example, when translating texts from German to English via the DeepL translator (<https://www.deepl.com/translator/>), it frequently preserves the nominalizations of the German source text instead of adopting phrasal sentence constructions in

English. However, the DeepL writing assistant (<https://www.deepl.com/write>) can help here to a certain extent, as it suggests stylistic recommendations that can be adjusted to different contexts of use (e.g. Academic English or Business English). Hence, by using different applications in concert, their strengths can be exploited and their limitations can be minimized. For this, however, a certain level of language proficiency and critical language awareness seems indispensable (see also Gießler, 2024).

3.2. AI Feedback on Speaking

To some extent, AI programs are already capable of providing feedback on speaking. However, they typically need to convert the spoken content into written form first. Hence, they rely on writing while bearing in mind the characteristics of spoken language. As automatic speech recognition (ARS) and automatic transcription have noticeably improved in the past years, feedback on speaking performance thus represents a promising future avenue. The AI system then “analyzes [learners’] speech patterns, identifies errors, and offers suggestions for improvement” (Fakher Ajabshir, 2023, p. 101).

For example, the app Kansei AI (<https://kansei.app/>) appears useful for practicing speaking skills and obtaining feedback on oral performance (Stannard, 2023, at <https://youtu.be/naiYoRDoHLo>). The interface and conversational style strongly resemble an instant messaging app, which allows for spoken and written chats. In this app, users can choose a life-like persona as their conversation partner and select a language as well as a proficiency level (beginner, intermediate, advanced). Moreover, they can choose a scenario to adjust the conversational style according to context (e.g. “as a friend”, “as a coworker”). To start a conversation, learners record their speech, which is then automatically converted into writing. On that basis, the AI persona provides a response in writing, which can simultaneously be played back. Moreover, it engages users in follow-up conversations, which can motivate them to practice their writing and speaking skills further (cf. Fakher Ajabshir, 2023, p. 101). Apart from chatting, the persona automatically offers feedback on the learners’ performance below the chat box, as depicted in Figure 3 and Figure 4.

Another noteworthy app is Speechmatics (<https://www.speechmatics.com/>). To facilitate multilingual communication and language learning, Speechmatics automatically transcribes spoken input and additionally offers live translations into another language. The dual coding of their spoken input and the transcription allows for a deeper consideration of their oral performance, as they can revisit it asynchronously. Moreover, by translating the text into a language they are more proficient in, they can check whether their speech conveys the intended sense (while being aware of potential inaccuracies of automated translations).

These technologies thus provide opportunities for (self-)assessment and language practice at different proficiency levels (Fakher Ajabshir, 2023, p. 101). They might also help to track progress over time (Inceoglu et al., 2023, cited by Fakher Ajabshir, 2023, p. 101). Similarly, educators could more effectively evaluate vocabulary usage, grammar, and pronunciation when speech and text are available simultaneously. They could pinpoint linguistic or stylistic errors in the transcript and add further feedback about students’ oral performance.

Figure 3: Chat with AI Feedback in Kansei

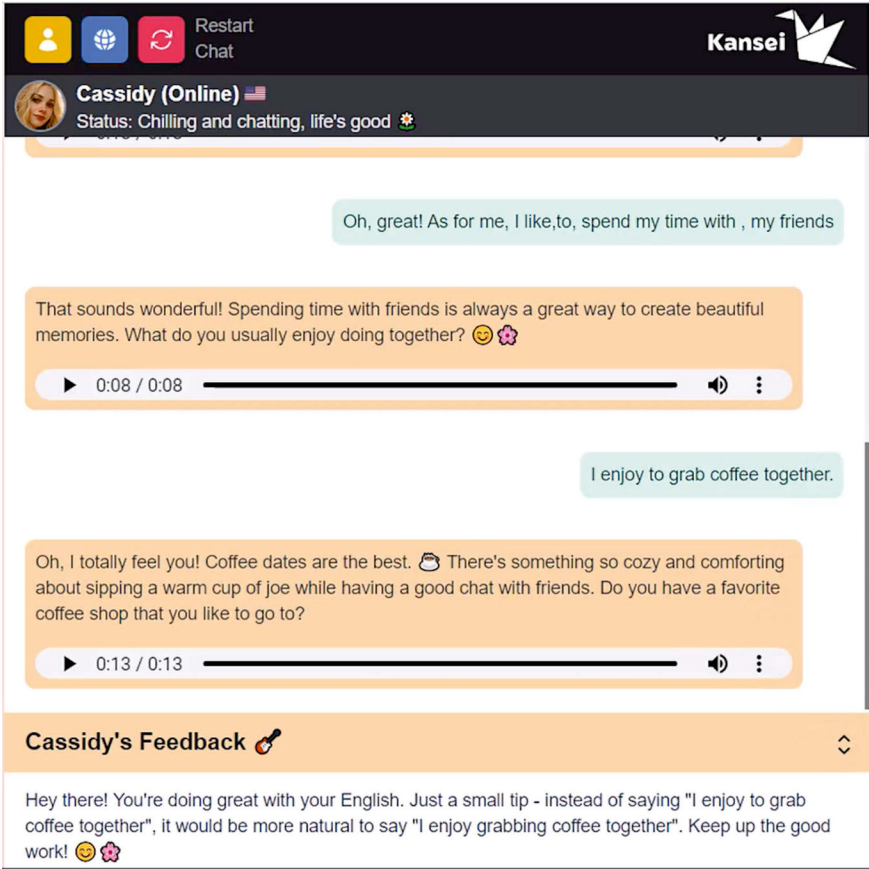
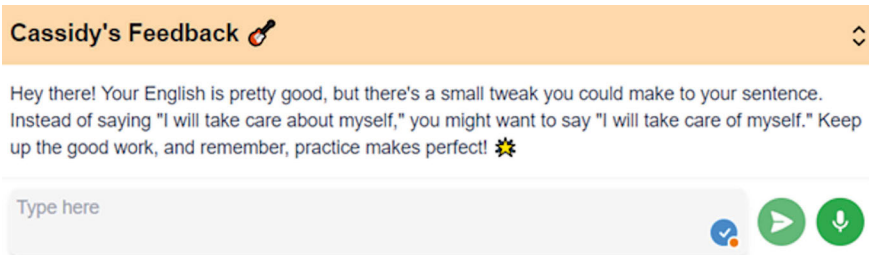


Figure 4: Feedback on Oral Performance in Kansei



However, most spoken AI feedback is still based on “standard” accents, such as British English or American English. There is thus much potential for future research to develop AI persona that are capable of conversing in a rich variety of English accents (see e.g. Ivanova, 2024, on Slavic English varieties, and Albrecht, 2024, on Chinese English varieties). This could help to make feedback dialogues with AI conversational agents sound more natural or authentic to the learners. Moreover, it might also support them in practicing listening comprehension when English is used as a lingua franca by speakers of different linguacultural backgrounds.

3.3. AI Feedback on Text Comprehension

There are also several AI tools available that summarize texts or answer questions about a text, such as DocGPT (<https://docgpt.io/>) or ChatPDF (<https://www.chatpdf.com/>). They assist users in understanding difficult texts, including research articles or textbooks. For instance, ChatPDF works directly in the browser and does not require any prior registration. By uploading a PDF of a publication, users are directly offered some guiding questions for text comprehension. This is what learners can use for self-study or what teachers could ask during classroom discussions. Moreover, users can pose these and other questions to the system to obtain relevant answers, as shown in Figure 5.

This AI tool can thus make difficult texts easier to understand. Ideally, learners try to answer their own or the suggested questions themselves before retrieving the responses by the AI system. The tool also works with other file types that can be converted into PDFs, such as presentations or texts that the students have written themselves. Thus, by uploading their own text draft to the AI system and reading the generated answers, writers can assess whether their text has been structured and formulated in a clear manner.

There are also further tools available that incorporate this technology, such as Monica's ChatPDF (<https://monica.im/webapp/doc-chat/>). In addition to identifying key information, summarizing texts and asking specific questions about it, the app offers translations into other languages. The PDF function, however, is only one feature of Monica (<https://monica.im/>), which is advertised as an “All-in-One AI Assistant”. It relies on the generative technologies used by GPT-4, Claude and Bard, and can be installed as a browser extension. It serves to answer questions about any website, including YouTube videos and emails, as well as documents. It also functions as a “writing agent” to support text composition processes (see York, 2023, retrieved from <https://youtu.be/uDXSkjucR3A>). Furthermore, it can generate images based on the user's commands (AI painting).

Figure 5: Text Comprehension with ChatPDF

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Pre-Service Teachers' Perceptions of Their Digital Feedback Literacy Development Before and During the Pandemic

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Abstract
Feedback is central to successful learning, but digital feedback still appears to be underutilized by teachers. As a result of the Covid-19 pandemic, its relevance for teacher education has increased. Through this paper reports on a three-year study that aimed to foster pre-service teachers' (PTE) digital feedback literacy. The study was conducted in two stages: first, pre-service teachers (PTE) and two at the start of the Covid-19 pandemic (N=28). This was followed by a second survey of the PTE perceptions of their digital feedback literacy development before and during the pandemic. Data were collected at various stages of the intervention through pre-, while, and post-surveys as well as the feedback videos that were created by the PTE. The different data sources were analyzed in a mixed-methods manner by means of statistical procedures and qualitative content analysis (Kocherz & Radlker, 2019). Through the intervention, the PTEs perceived an increase in their digital feedback literacy. This was demonstrated by their heightened knowledge, positive attitudes and technological-pedagogical skills in the production of feedback videos, especially in the pandemic courses. The contribution will close with recommendations for developing dynamic digital feedback literacies among (pre-service) teachers in the future.

Keywords
Digital feedback literacy, preservice teachers, teacher education, Covid-19, screencast feedback

1 Introduction
The development of digital literacy is a complex and continuous process due to the dynamic changes in the digital landscape. One of the main challenges of digital literacy is the need for continuous learning and adaptation. This is especially true in the field of education, where digital literacy is essential for effective teaching and learning. The Covid-19 pandemic has accelerated the need for digital literacy, as educators have had to quickly transform their teaching and learn to use digital tools and platforms. This has led to a renewed focus on digital literacy and the need for educators to develop the skills and knowledge necessary to effectively use digital technologies in the classroom. This paper reports on a three-year study that aimed to foster pre-service teachers' (PTE) digital feedback literacy. The study was conducted in two stages: first, pre-service teachers (PTE) and two at the start of the Covid-19 pandemic (N=28). This was followed by a second survey of the PTE perceptions of their digital feedback literacy development before and during the pandemic. Data were collected at various stages of the intervention through pre-, while, and post-surveys as well as the feedback videos that were created by the PTE. The different data sources were analyzed in a mixed-methods manner by means of statistical procedures and qualitative content analysis (Kocherz & Radlker, 2019). Through the intervention, the PTEs perceived an increase in their digital feedback literacy. This was demonstrated by their heightened knowledge, positive attitudes and technological-pedagogical skills in the production of feedback videos, especially in the pandemic courses. The contribution will close with recommendations for developing dynamic digital feedback literacies among (pre-service) teachers in the future.

As a teacher educator in the field of TESOL, I likewise faced several challenges arising from the

What is the article about?

Hello and welcome to this informative PDF file on Pre-Service Teachers' Perceptions of Their Digital Feedback Literacy Development Before and During the Pandemic! This study sheds light on the importance of digital feedback literacy for teacher education, especially in the context of the Covid-19 pandemic. The findings show that pre-service teachers perceived an increase in their digital feedback literacy through the intervention.

Example questions:

- What specific strategies were used to foster pre-service teachers' digital feedback literacy?
- How did the Covid-19 pandemic impact pre-service teachers' perceptions of their digital feedback literacy development?
- What were some of the challenges faced by pre-service teachers in developing their digital feedback literacy?

The article is about Pre-Service Teachers' Perceptions of Their Digital Feedback Literacy Development Before and During the Pandemic. It discusses the importance of digital feedback literacy for teacher education, especially in the context of the Covid-19 pandemic, and presents findings on how pre-service teachers perceived an increase in their digital feedback literacy through the intervention.

What research methodology was used in the study?

The study used a mixed-methods research design, which involved both quantitative and qualitative data collection and analysis. The data were collected through pre-, while-, and post-surveys, as well as feedback videos created by the pre-service teachers. The surveys contained a mixture of open-ended and closed questions, including 5-point Likert scales, and were implemented online using the application Socsurvey. The data from the closed survey questions were analyzed statistically using Microsoft Excel. The qualitative data from the feedback videos were analyzed using thematic analysis.

Ask any question...

3.4. AI Feedback on Presentations

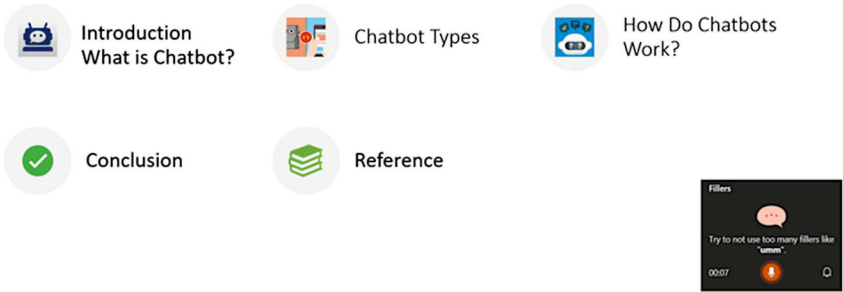
While presentation slides (or PDFs thereof) can be uploaded to various AI assistants, such as DocGPT, ChatPDF or Claude AI (<https://claude.ai>), for feedback purposes and text comprehension, there are also specialized tools for slide design and discussion. For example, Visme AI (<https://www.visme.co/ai-presentation-maker/>) is typically advertised as an effective tool for producing appealing marketing materials (presentations, documents, infographics, social media posts etc.), but it can also be used for enhancing presentations and other teaching materials in educational settings. With its comprehensive template library, intuitive interface and collaborative features, this tool can support teamwork and peer feedback processes during slide design (see Visme, 2020, at <https://youtu.be/oQW813hJxsA>). Visme AI assists students in the creation process, such as through its integrated tools “AI Writer” and “AI Image Generator”. Moreover, creators can share the presentation link with their peers and instructors, who can add comments to specific locations on the slides by using various annotation tools, such as underlining, boxes, arrows etc. The creator and other collaborators can reply to the comments in discussion threads and mark them as resolved once they have been enacted or clarified.

The AI-powered design of presentation slides has also been tested with another application, Beautiful AI (<https://www.beautiful.ai/>). Through prompting, users can generate presentation slides. Thus, instead of running text, slides with key points and visualizations are created for presentation purposes. It seems to work with different types of charts and other illustrations pertaining to common knowledge. For example, when asked to create a word cloud of the planets in the solar system, it yielded a fitting visualization. Upon closer inspection, however, it also contained several general words that would need to be eliminated from the cloud, such as “gravity”, “solar system” or “universe”. Moreover, when prompted to generate a slide about digital feedback literacy, it only adduced four general points that did not deal with feedback in particular and also did not include any sources. Overall, it rather seems to be useful for slide design rather than slide contents, at least at the current stage of development.

While the content-generation still has limitations, there are also useful AI tools for learners to rehearse their presentations and obtain immediate feedback about their performance. In Microsoft PowerPoint, users can activate the “Rehearse with Coach” function when practicing their presentation. When talking about the slide contents, users receive instant feedback about common shortcomings of presentations, such as the excessive use of filler words. As shown in the bottom-right corner of Figure 6, the tool suggests to the presenter that they should “try to not use too many fillers like ‘umm’.”

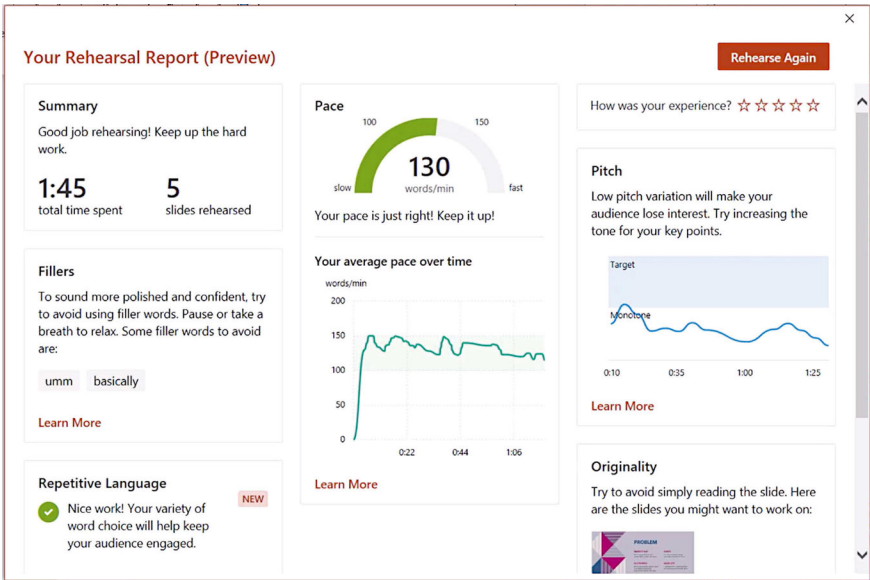
Figure 6: “Rehearse with Coach” Feedback in Microsoft PowerPoint

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Moreover, the program provides a “Rehearsal Report” at the end (see Figure 7).

Figure 7: Rehearsal Report in Microsoft PowerPoint



3.5. AI Feedback on Lesson Planning and Materials Development

ChatGPT and more specialized AI tools can support (pre- and in-service) teachers in lesson planning and materials development (Amin, 2023, p. 2). They help to craft course outlines and tasks which are tailored to specific learning objectives and student needs (Amin, 2023, p. 2). For instance, to-teach.ai is a promising AI-driven application that

can help educators create customized lesson plans and task sheets for texts, images, videos and websites. With this tool, teachers can adjust various settings to create the most fitting lesson plans for their learners. Similarly, further applications such as auto-classmate.io or lessonplans.ai can assist in the creation and development of lesson plans. Even though such applications do not yet incorporate a feedback feature for drafted lesson plans, they could be combined with other tools (e.g. ChatGPT) to receive such feedback.

3.6. AI Feedback on Teaching

Especially for pre-service teachers, but also for continuous reflection and professional development, feedback on teaching performance is crucial. However, such feedback opportunities are typically severely limited to a few occasions of trial lessons, e.g. as part of teacher education or job applications. Moreover, teachers are often hesitant to invite colleagues or external persons to observe their lessons. Therefore, a less intrusive option could be granted by AI technologies. For example, with the TeachFX app (<https://teachfx.com/>), teachers can record a lesson, provided that all required permissions for such a recording have been obtained. The app then evaluates the session and creates a detailed report, together with feedback on instructional practices. For example, it generates word clouds of the words that the teacher and the students mostly used during the lesson, together with reflective questions, e.g. “Does this vocabulary reflect your objectives for this lesson?” (TeachFX, 2022, at <https://youtu.be/QIL6mQGDTME>). The aim is to improve teaching and increase student engagement and learning.

Another possibility would be the use of AI feedback in classroom simulations. For instance, Kirubarajan et al. (2022) focused on personalized and automated (preferably real-time) feedback in medical training (surgical). In other words, medical students received feedback from an AI in a simulation. However, a specific name of an AI tool was not mentioned. Through a brief web search, the simulation app Simofun (<https://www.simofun.com/siminclass>) was found. It utilizes virtual and augmented reality to help teachers practice classroom interactions with 3D student avatars. The app considers various aspects of classroom management and evaluates instructor performance, complemented by suggestions for further improvement. Based on the training history, trainee teachers can also obtain feedback on their progress.

With further advancements in AI technologies, it is likely that the quality and scope of feedback will be improved for the benefit of teachers and learners.

4. Discussion

This chapter has shown that AI technologies offer unprecedented possibilities for personalized feedback on a variety of skill areas. However, there are several challenges that still need to be addressed adequately. This section will therefore outline some suggestions for future research and teaching in the field of AI-enabled feedback practices.

4.1. Suggestions for Future Research

Future research on AI feedback should take a multifaceted and transdisciplinary approach to enhance existing affordances while reducing still-prevailing limitations.

Firstly, the reliability and accuracy of AI-generated responses needs to be improved continuously (Amin, 2023, p. 11; Fakher Ajabshir, 2023, p. 108). In that regard, studies should elicit practices and perceptions from a diverse range of teachers and students in different disciplines, educational institutions and sociocultural environments (cf. Gültekin Talayhan & Babayiğit, 2023, p. 91). AI feedback in heterogeneous and multilingual classrooms could be a particularly fruitful avenue (Amin, 2023, p. 11). Moreover, ethical guidelines for utilizing AI in education need to be established and enacted (Fakher Ajabshir, 2023, p. 108). In that respect, a balanced and human-centered AI approach that focuses on fostering learners' agency and critical thinking appears crucial.

An exploration into multimodal AI avenues, such as Virtual Reality (VR) and game-based learning, is another promising area for investigation. While VR holds potential in mitigating language learning anxieties, its high cost and limited accessibility necessitate critical consideration (see the review by Fakher Ajabshir, 2023, p. 106). Moreover, game-based learning might facilitate collaborative learning through social interactions among learners but it requires more research into its effectiveness (Fakher Ajabshir, 2023, p. 104). As far as feedback processes are concerned, much game-based learning or gamified language learning apps still need to move beyond mere error correction.

Additionally, it is essential to investigate students' actual learning gain (Fakher Ajabshir, 2023, p. 108) as compared to and when combined with other feedback methods. Research in this area will also help to derive recommendations for feedback practices, which will be considered next.

4.2. Suggestions for Teaching Practices and Policies

As Baker and Smith (2019, pp. 41–42) emphasize, AI is not only changing the “how” but also the “what” of assessment. Instead of putting a focus on knowledge-testing, feedback should ideally encourage learners' critical thinking and foster their problem-solving skills (Baker & Smith, 2019, p. 42).

With critical thinking having become more fundamental than ever before, teachers should engage in dialogues with their students to reflect on the affordances and limitations of AI (Kostka & Toncelli, 2023, p. 13) and to encourage its judicious usage (Rudolph et al., 2023, p. 355). Together with their students, educators should discuss and co-create guidelines for AI use in their courses (Kostka & Toncelli, 2023, p. 12; cf. the review by Moorhouse et al., 2023, p. 8). They could explore AI tools in the classroom to become aware of their limitations and possible areas of use (Spannagel, 2023, p. 1). Indeed, in Moorhouse et al.'s (2023) review of official guidelines, most of them recommended the implementation of “an assessment task that requires students to generate responses on tools such as ChatGPT and then critique their responses” (p. 7).

Provided that their use is not prohibited, students need to acknowledge their usage of specialized AI tools for assignments and cite them appropriately (MU guideline, quoted in Moorhouse et al., 2023, p. 7; Spannagel, 2023, p. 1). However, it is crucial for the stu-

dents to realize that, in the end, they will be held accountable for any errors that might have been produced by the AI tool (Spannagel, 2023, p. 1). It is therefore their responsibility to verify the correctness of the information that the AI system has provided (Foltýnek et al., 2023; Peres et al., 2023; both cited by Moya & Eaton, 2023, p. 4; Spannagel, 2023, p. 1). As Spannagel (2023) emphasized, “[t]he tool does not think *for you*, but *you think with the help of the tool*” (p. 1; original emphasis).

To make appropriate assessments, AI feedback crucially needs to be combined with human judgment, including the students themselves, their peers, their teachers and potentially further relevant persons (e.g. mentors in teacher education) (cf. Baker & Smith, 2019, p. 44). Collaborative learning projects, peer feedback and group discussions appear beneficial to this end (Amin, 2023, p. 5).

Altogether, AI literacy is an emerging key notion in the area of digital literacy (e.g. Rütli-Joy et al., 2023). As digital technologies have become an integral part of everyday life and many professional contexts, it is vital to build students’ capacities “to use, understand, and critically assess various digital tools” and diverse sources of information while being acutely aware of potentially biased output and security threats (Amin, 2023, p. 5; see also Moya & Eaton, 2023, p. 4). Consequently, it is essential for teachers and students to use AI in a responsible and ethical manner (Rütli-Joy et al., 2023, p. 175; cf. Kohnke et al., 2023, p. 10). In that respect, the so-called 4Ms and 4Cs frameworks might serve as a useful orientation.

The “4 Cs” are four fundamental skills needed for 21st-century learning (Trilling & Fadel, 2009). They include critical thinking, communication, collaboration, and creativity. The first C, “critical thinking and problem solving”, involves students’ ability to actively filter, analyze, synthesize and question information from diverse sources to construct meaningful understandings and solutions (Partnership for 21st Century Skills, 2009; cf. Anugerahwati, 2019, p. 166). The second C, “creativity and innovation”, underscores a person’s capacity to generate novel ideas individually and collaboratively, be open towards new perspectives and implement as well as assess innovations for continuous improvement (Partnership for 21st Century Skills, 2009). The third C, “communication”, entails the ability to effectively convey ideas and information in a concise, clear, and coherent manner (Anugerahwati, 2019, p. 166) as well as in different media and modes (and languages). It also comprises attentive listening and meaning negotiation in interpersonal interaction (Partnership for 21st Century Skills, 2009). The fourth C, “collaboration”, requires proactive engagement with others and denotes the ability to utilize their distinct personalities, talents and expertise effectively and responsibly to synergistically produce better outcomes that benefit the community (Anugerahwati, 2019, p. 166; Partnership for 21st Century Skills, 2009). Collaboration can thus cultivate creativity and rests on effective communication skills (Tom, 2015, p. 24), which underscores the manifold connections between the different Cs.

The “4Ms”, in turn, emphasize that changes need to occur at all organizational levels in interconnected ways (micro, meso, macro, mega). These levels span from individual behaviors and actions to broader institutional and societal contexts (as reviewed by Moya & Eaton, 2023, pp. 6–10; Schmohl et al., 2023, pp. 10–11). More precisely, the micro-level refers to the realm of the individual practitioner and involves an understanding of how individuals could contribute to learning and organizational change (Moya & Eaton,

2023, p. 6). Here, it is worth investigating teachers' and students' use of AI in concrete learning settings (Schmohl et al., 2023, p. 10). Second, the meso-level relates to support units, networks, departments or committees that seek to transform policies into actions (Moya & Eaton, 2023, p. 6). For instance, AI could become part of curricula which are then enacted at the micro-level (Schmohl et al., 2023, p. 11). Both informal and formal faculty peer coaching and mentoring could be conducive in that regard (Moya & Eaton, 2023, p. 10). Moving to the macro-level, the focus shifts to the policies and processes that are set by an organization, e.g. the official guidelines on AI usage that were released by the university (Moya & Eaton, 2023, p. 6; Schmohl et al., 2023, p. 11). Finally, the mega-level pertains to practices at larger (e.g. national or global) levels (Moya & Eaton, 2023, p. 6). For example, guidelines issued by the European Commission or the UNESCO on AI would become relevant here.

It is also clear that processes of change cannot solely be driven by top-down processes at mega- or macro-levels, but likewise need to incorporate practices and challenges found at micro- and meso-levels. Altogether, this can lead to a more holistic and inclusive approach to fostering AI literacies in educational contexts and beyond.

5. Conclusion

In conclusion, the integration of AI feedback into teaching and learning processes necessitates a balanced and thoughtful approach (cf. e.g. Fakher Ajabshir, 2023, p. 101). While AI offers numerous advantages, its implementation should be coupled with critical thinking and verification procedures to ensure pedagogical effectiveness and an ethical use. In that respect, it is crucial to “strik[e] a balance between AI assistance and [...] student agency” (Darvishi et al., 2024, p. 12) as well as human interaction (Amin, 2023, p. 12), which can be achieved through the development of AI literacy (Rütli-Joy et al., 2023). AI could be incorporated into single courses and curricula in a needs-based and iterative matter through collaborative dialogue between students, teachers and other relevant stakeholders (cf. Rütli-Joy et al., 2023, p. 183).

While AI presents unprecedented possibilities for learners through automated feedback provision, it is nevertheless crucial to recognize the essential role of teachers and peers to establish social relations and exchange personalized feedback, which in turn can boost learners' confidence (Schmied, 2023, p. 6). Likewise, AI can strengthen students' self-regulated learning through customized feedback and learning recommendations. AI might also help learners develop a sense of agency as they are no longer reliant on teachers as the sole source of feedback (cf. Iftanti et al., 2023, p. 458). As with all other digital feedback methods, there is thus a widespread consensus that AI feedback needs to be used in conjunction with other digital and non-digital sources of feedback to gain a deeper understanding in a variety of skill areas and knowledge domains (see Schluer, 2022).

With these new developments, also the “Digital Feedback Map” (Schluer, 2023) is likely to grow further, even beyond the official project duration (09/2022–11/2023). For example, a video tutorial about “AI feedback on speaking and writing” via the Kansei app was added in December 2023. Moreover, a transdisciplinary project between the

humanities and the natural sciences is taking place since summer 2024 (Schluer & Meier, 2024), which is likely to produce additional inspirations for future research and teaching practice in the ever-growing field of digital feedback.

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Appendix

Short Biographical Notes of Contributors

Erhan Altay was born in Turkey and received his bachelor's degree in English Language and Literature from Ege University in Izmir. At the time of writing, he was pursuing a master's degree in the field of English and American Studies at Chemnitz University of Technology in Germany and afterwards finished his studies in 2024. His interest lies in digitalized language education, and he is passionate about exploring new ways to make language learning more engaging and effective through the use of technology.

Ezgi Irem Bekci holds a bachelor's degree in English Language and Literature from Ege University, Izmir, Turkey. Currently, she is pursuing a master's degree in English and American Studies at Chemnitz University of Technology, Germany, with a focus on TESOL. Her interest in digital technologies was sparked while working as a social media content moderator at an international company. She noticed the crucial role that social media and digital technologies play in daily life. Thus, she combined her experience in this area with her field of study and, currently, she researches digital learning.

Daniel Brand is a research associate at the Professorship Predictive Analytics at the Chemnitz University of Technology (TUC). He obtained his bachelor's degree and his master's degree in computer science at the University of Freiburg. His research interests lie in the field of human reasoning, with a focus on predicting reasoning behavior using cognitive modeling and information systems.

Dr. Annika Brück-Hübner is a lecturer at the "Department of Early Childhood and Teacher Education" of Justus-Liebig-University Giessen and a researcher at the "Center for Cooperative Teaching and Learning" (ZekoLL) at the Technische Hochschule Mittelhessen (THM) (Germany). Her research focuses on higher education, with an emphasis on internationalization, digitalization, e-portfolio work, reflexivity and feedback.

After graduating with a BA in 2012 with a focus in theatre pedagogy at Griffith University, **Amanda Yi Chng** began teaching in Singapore. From 2017 onwards, she spent two years in Chemnitz at a non-profit organization assisting communities in asylum; and

another two years, working alongside students with dyslexia. At the time of writing, she was enrolled in her final Master semester of English and American Studies at Chemnitz University of Technology.

Dr. Anastasia Drackert is research director at the Society for Academic Study Preparation and Test Development (*Gesellschaft für Akademische Studienvorbereitung und Testentwicklung e.V.*, <https://www.gast.de/>) and professor of language testing and digital learning at the German Department at Ruhr-University Bochum. She possesses extensive experience in teaching German, English, and Russian, as well as in training both prospective and in-service foreign language teachers.

Dr. Ralf Gießler is a senior lecturer for TEFL (Teaching English as a Foreign Language) at the Department of English and American Studies at Wuppertal University. After teaching English at secondary school, he joined the university and has conducted several research projects since then. His research interests lie in the fields of lexical learning, automated writing evaluation and language awareness.

Julia Lankl has a master's degree in "German as a Foreign and Second Language". After teaching German didactics for prospective elementary teachers at KPH Wien/Krems, she started her PhD studies at the University of Vienna in 2024. So far, her research mainly focuses on oral interaction in the L2 classroom, e.g. teacher's language use and language awareness as well as errors and feedback.

Yarong Liu obtained a master's degree with a specialization in TESOL in 2021. Afterwards, she started her doctoral research on intercultural communicative competence in English language teaching at Chemnitz University of Technology. Her research interests include intercultural competence, English as a lingua franca, and curriculum planning.

Jana Maria Olejniczak is a student in a Master program for TEFL (Teaching English as a Foreign Language) at Wuppertal University in Germany. She has gathered EFL teaching experience in placements at secondary schools.

Ines Paland-Riedmüller works at the Society for Academic Study Preparation and Test Development (*Gesellschaft für Akademische Studienvorbereitung und Testentwicklung e.V.*, <https://www.gast.de/>). She develops and implements online German courses with a specific focus on Higher Education contexts for Deutsch-Uni Online (www.deutsch-uni.com), including the online preparation group course "Training digitaler TestDaF".

Marco Ragni is a full professor at the TU Chemnitz and chair of Predictive Analytics, focusing on the intersection of computational cognitive science and artificial intelligence. His research includes predictive modelling of cognitive processes, particularly in reasoning and decision-making, and extends to human-system interaction and cognitive systems in teaming context.

Jenny Rettstatt is a research associate at the Chair of Predictive Behavior Analysis at Chemnitz University of Technology (TUC). She received her bachelor's degree in Cognitive Science from the University of Tübingen, Germany, and her master's degree in Sensory and Cognitive Psychology from TUC. Her research interests include reasoning, psychophysics, and cognitive psychology.

Günter Daniel Rey has been a full professor of Psychology of Learning with Digital Media at the TU Chemnitz since 2013. His research expertise focuses on cognitive, motivational, emotional and social aspects of conducive design principles in the field of learning with digital media.

Dr. Jennifer Schluer is an Assistant Professor for TESOL (Teaching English to Speakers of Other Languages)/ Advanced Academic English at Chemnitz University of Technology, Germany. She specializes in English language teacher education with a focus on digital teaching and digital feedback methods, academic writing and reading comprehension as well as language awareness, multilingualism and culture learning. Her textbook about *Digital Feedback Methods* was published in 2022.

Manuel Schmitz is a research associate at the Chair of Psychology of Learning with Digital Media at Chemnitz University of Technology (TUC). He received his bachelor's degree in applied psychology from Fresenius University of Applied Sciences in Munich, Germany, and his master's in Media and Instructional Psychology from TUC. His research interests include self-regulated learning, feedback.

Anna-Katharina Scholz is a research and teaching assistant at the FAU Center for Teaching and Learning in Higher Education (FBZHL) and at the Chair of English Linguistics at FAU Erlangen-Nuremberg. She is currently writing her PhD thesis on factors influencing the acquisition of collocations in foreign language learning.

Martina Seemann is a research associate at the Chair of Psychology of Learning with Digital Media at Chemnitz University of Technology (TUC). She received her bachelor's and master's degree in psychology from Johannes Gutenberg University Mainz, Germany. Her research interests include optimization of educational media for students with attention deficit hyperactivity disorder (ADHD) and digital game-based learning.

Simone Weidinger has been teaching German as a foreign language in various institutions for many years; the focus of her work has been exam preparation courses. She is also an author of exam preparation books and textbooks as well as a test rater. She works as an online tutor of the group course "Training digitaler TestDaF" of Deutsch-Uni Online.

Sara Wohlschläger is a student at Leipzig University in the teacher training program for English and French. From November 2020 until December 2023, she worked as a student assistant in the project "Untersuchung zur Nutzung digitaler Feedbackinstrumente bei Studierenden des LA Englisch" (Study on the use of digital feedback tools by English teaching students) which is part of the joint project "PraxisdigitaliS – Praxis dig-

ital gestalten in Sachsen” (PraxisdigitaliS – Designing digital practices in Saxony) funded by the *Bundesministerium für Bildung und Forschung* (BMBF).