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Educational Media Ecologies

Herausgegeben von Dorothee M. Meister, Theo Hug und Norm Friesen

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Editorial: Educational Media Ecologies

Dorothee M. Meister, Theo Hug, and Norm Friesen

From educational gaming through portable e-readers to cell phones, media are interpenetrating educational spaces and activities. Accordingly, understanding media in environmental or ecological terms has become increasingly important for education internationally. In North America, for example, the centenary of McLuhan's birth has focused attention on approaches to media – whether oral, textual, electronic or digital– as a kind of environment in which education takes place. In parts of Europe, the so-called mediatic turn – following on the linguistic and iconic turns – has similarly emphasized the role of media as a condition for the possibility of educational activities and programs.

With a few exceptions[1] the papers in this special issue were first presented at the conference «Educational Media Ecologies: International Perspectives» which took place at the University of Paderborn, Germany, on March 27–28, 2012.[2] The event was an interdisciplinary and transatlantic endeavor to bring together a wide range of perspectives on various issues relevant to educational media ecologies,[3] and on related debates on mediation, medialization, mediatization, and mediality.[4] The purpose of this volume, like the conference, is to foster and deepen international dialogue in the area of educational media. Areas of research and scholarship relevant to this dialogue include educational media, media literacy, educational philosophy, and media and cultural studies.

The contributions, described below, put conceptual issues as well as social practices and applications at the center of the debate.

Klaus Rummler opens the issue by clarifying the concept of ecology itself. Referencing a range of work over the past 50 years, Rummler describes how ecological models have been cast in sociological, semiotic, cultural, mediatic and other terms, and he explains the implications of these various perspectives for the study of educational contexts. Rummler also briefly introduces the reader to the triangular model used by Bachmair, Pachler and Cook in this issue (and in other publications) to

1 The exceptions are the papers by Rainer Leschke and Norm Friesen, Michael Kerres and Richard Heinen, and Theo Hug.

2 See: http://kw.uni-paderborn.de/institute-einrichtungen/mewi/arbeitsschwerpunkte/prof-dr-dorothee-m-meister/tagungen/educational-media-ecologies-international-perspectives/ (2014-7-8).

3 Cf. definitions of the Media Ecology Association (MEA): http://www.media-ecology.org/media_ecology/index.html (2014-7-8).

4 For more about these variations on the terms «media» and «mediation», see: Norm Friesen and Theo Hug. 2009. «The Mediatic Turn: Exploring Consequences for Media Pedagogy.» In Mediatization: Concept, Changes, Consequences, edited by Knut Lundby, 64–81. New York: Peter Lang. http://learningspaces.org/papers/Media_Pedagogy_&_Mediatic_Turn.pdf.

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analyse the socio-cultural and cognitive possibilities opened up by various mobile media.

Sandra Aßmann and Bardo Herzig discuss three theoretical approaches – a network perspective, systems theory and semiotics – in order to conceptualize and analyze learning with media in a range of formal and informal settings. They use the example of «friending» someone via Facebook, a context in which the formal and informal often intersect in unexpected ways. In this way, Aßmann and Herzig demonstrate the manifest complexities of communication analysis and pragmatics in these relatively new networked, mediated contexts.

Judith Seipold provides an extensive overview of the burgeoning literature on the use and potential of mobile technologies in learning and educational ecologies. The research perspectives or frameworks covered by Seipold include critical, ethical, resource-centered, learning process-centered as well as ecological frames of reference. In her coverage of the last of these, not only does Seipold help to reframe the theme of this special issue as a whole, she also provides an excellent segue to the ecologically oriented analysis of «mobile learning» that follows.

Ben Bachmair and Norbert Pachler's contribution, «A Cultural Ecological Frame for Mobility and Learning», reflects the work of the London Mobile Learning Group, examining mobile resources and affordances from the ecological perspectives of Gibson, Postman and the seminal German media-pedagogue, Dieter Baacke. Using the structuration theory of Anthony Giddens, Bachmair, Norbert and Cook elaborate the aforementioned triangular model for understanding both the agency and the cultural and structural constraints offered by mobile technologies.

In «Building as Interface: Sustainable Educational Ecologies», **Suzanne de Castell, Milena Droumeva and Jen Jenson** connect learning and media ecologies with the material, global and ecological challenges that have become a part of the anthropocene. They do so by examining the mediation of a physical, architectural environment, their own departmental environment at Simon Fraser University. De Castell, Droumeva and Jenson uncover a range of practical and theoretical challenges, and explore the implications for both body and mind.

Markus Deimann takes the reader back into the history of continental educational theory, to Humboldt's (and others') expansive understanding of Bildung, to suggest a conceptual ecology germane to the manifold possibilities that are now on offer through open education. Deimann sees the «open paradigm» as changing education utterly – and for the better. It will do so, Deimann predicts, by «unbundling» resource and service provision, and assessment and accreditation functions that have for too long been monopolized by the educational monoliths known as «universities».

Theo Hug's contribution, «Media Form School – A Plea for Expanded Action Orientations and Reflective Perspectives» similarly looks to the past to envision possibilities for the future. Hug's concern is with the narrow confines in which media

are conceptualized and operationalized in many K-12 educational ecologies, and in the corresponding policy and curricular documents that further constrain and direct this action. Hug suggests looking to the recent past, the 1970s and 1960s, in which alternatives were envisioned not only by figures like McLuhan and Illich, but also intimated in the works of Austrian poets and artists.

Norm Friesen provides the third «rearview mirror» perspective in his examination of the lecture as a trans-medial pedagogical form. From the late medieval university through to today's IGNITE and TED talks, the lecture has accommodated and reflected a wide range of media ecologies, technical conditions and epistemological patterns. New media technologies –from the (data) projector to lecture capture media– have not rendered the lecture obsolete, but have instead foregrounded its performative aspects and its ongoing adaptability.

Michael Kerres and Richard Heinen take as their starting point Deimann's, Hug's and Friesen's stress on the manifold possibilities presented digital and open educational resources. They then seek to answer the question: How can this embarrassment of riches be put to good use in K-12 educational contexts? Their answer: «Edutags», a way of making resources more accessible and usable by providing descriptive and evaluative information along with such resources.

Heinz Moser and Thomas Hermann present the concept and first results of the project «Visualized Vocational Aspirations: Potentials of photography for career counselling and vocational preparation».[5] The research project is a cooperation between the Zurich University of Teacher Education (Pädagogische Hochschule Zürich) and the «Laufbahnzentrum» (Centre of Vocational Counselling) Zürich. Based on an ecological approach of narrative career education and a design-based research methodology the undertaking aims at creative applications of visual storytelling in career counselling.

Rainer Leschke and Norm Friesen conclude the issue with what might be called an aesthetic- or formal-ecological perspective. The digital convergence of textual and other media forms, Leschke and Friesen maintain, means the erasure of formal and material distinctions traditionally embedded in separate media. Educational (and other) institutions have oriented long themselves on the basis of such distinctions; and what is now left are distinctions based only on recombinant, virtual aesthetic markers.

5 The project is funded by the Swiss National Science Foundation (project 136617, duration: March 1, 2012 – February 28, 2015).

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Themenheft Nr. 24: Educational Media Ecologies

Foundations of Socio-Cultural Ecology

Consequences for Media Education and Mobile Learning in Schools

Klaus Rummler

Abstract

This conceptual paper offers insights to the foundations of Socio-Cultural Ecology and relates this concept to traditional concepts of Ecology e.g. media ecology or Bronfenbrenner's ecological model of child development. It will further discuss the term «ecology» as a relation between learners and their surrounding physical and structural world, e.g. an ecology of resources or the classroom as an ecological system. Thirdly more recent concepts in ecology will be considered e.g. Digital Media Ecology including media ecology (German: Medienökologie*) from a German perspective. This contribution tries to describe common principles of (media) ecologies and will ask after their meaning and relation to media education and mobile learning. One of the main results is the realisation that cultural practices of school learning and cultural practices of media acquisition take place in different worlds or in different ecological spheres. The question is thus again of how to bridge these ecological spheres, and how «agency» developed outside school, can be nourished inside school. In other words: how can we bridge socio-cultural and technological structures within these cultural practices.*

Socio-Cultural Ecology and its backgrounds, using the example of some of the at-risk learners' usage patters of mobile technologies

Media and technology are an important part of everyday life and the term mediatization describes this complex interrelation between changes in media and mass communication, and changes in culture and society (Hepp and Krotz 2012, 11). Face-to-face communication today is supplemented but not supplanted by technology. Media and technology are seen as cultural products that have been developed and emerged within certain cultures and are thus parts of these cultures. For young people, appropriation then means the competent integration of these cultural products into their life-worlds as such objects are available as cultural resources. In this perspective learning is just a more specific form of appropriation and very common for children and adolescents.

When focussing on new forms of appropriation and learning among young people, especially where mobile technologies are at play (*Mobile Learning*), it

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seems necessary to consider a triangular relation between the individuals' agency, socio-cultural and technological structures and relating cultural practices (Pachler, Bachmair, and Cook 2010).

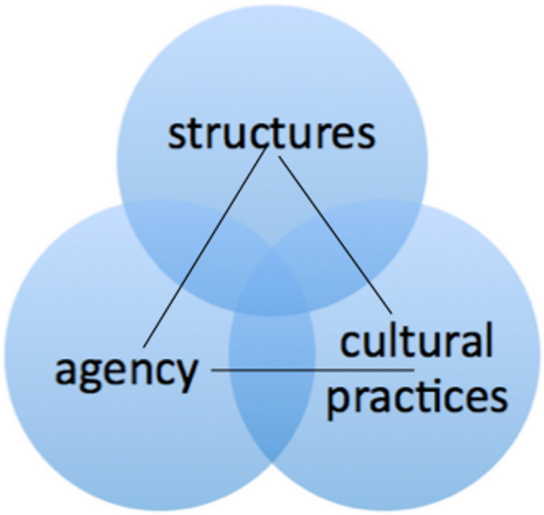

Fig. 1: Triangle of the «Mobile Complex» (Pachler, Bachmair, and Cook 2010, 25).

This Socio-Cultural Ecology or «Mobile Complex» is shaped by the individuals' usage of media and e.g. their everyday media literacy (*agency*). *Socio-cultural structures* play an important role in this ecology as media usage is also driven by the different aesthetic preferences of the socio-cultural milieux or social segments that structure modern societies. *Technological structures* mark current potentials for devices, networks and software. *Cultural practices* as the third cornerstone are sedimented routines which are part of a certain culture (e.g. the cultural assumption of how learning works in schools, or how we usually would use mobile phones in public). Each of these cornerstones and the way how they interrelate are subjects of constant change and negotiation as described in the term «mediatization». The question of the opportunities for media education of at-risk learners is founded on the theory of media education (German: *Medienbildung*) and the cultural-theoretical model of the Socio-Cultural Ecology (Pachler, Bachmair, and Cook 2010). It is based on Anthony Giddens' Structuration Model (Giddens 1984) and on the theory of media literacy as a cultural practice by David Buckingham (Buckingham and Sefton-Green 2003).

In order to describe the complex relationship between individuals, media and society within a wider context of appropriation and learning, it makes sense to use an ecological approach. This contribution tries to trace back the origins of Socio-cultural Ecology. The focus of this text is to look closely on individual definitions and concepts of ecology. One of the central questions for this literature review is

what the authors understand by ‹ecology›, examining the centres of the discussion in order to clarify why it is useful to apply an ecological approach. As found in Rummler (2012) Socio-Cultural Ecology can indeed be applied to the use of mobile technology of at-risk learners. Among of the concrete questions in this research were: «What does the Socio-Cultural Ecology of lower class adolescents (at-risk learners) look like and how does it differ from upper class adolescents?» The question of the role of media and technology still remains: Is media or technology a resource which is available for use and integration into one's own lifeworld and does it form contexts together with our own behaviour and use?

Traditional concepts of ecology – The world as it used to be and the media

The common core of the concepts of ecology presented in this section is the relationship between living organisms and the physical world. The physical world in this section includes all living organisms like people, animals, and plants, but also weather, climate, geology and biology. This applies to Human and Social Ecology, Cultural Ecology and Media Ecology. Semiotic Ecology goes beyond this, and asks whether such a concept of dividing the physical world from subjects and individuals is still valid when looking at nature in a mediated way. All of these concepts of ecology will only be outlined briefly. As media ecology had greater influence it will be outlined in a separate section. Bronfenbrenner's Ecological Model of child development with its great importance for educational sciences will sum up this chapter.

Ecology as the relationship between living organisms and the physical world

- Human and Social Ecology (Human- und Sozialökologie)

Social ecology is concerned with the relationship between people and their natural and social environment. The goal of this interdisciplinary academic field is help to develop and reproduce a society and its natural basis of life. (Becker and Jahn 2000) This concept which is strongly situated in sociology varies from the concept of Human and Social Ecology developed in the USA. The term «new ecological paradigm» was intended to include natural sciences as the interface between sociology and natural science to describe society as also dependant on biological and physical determinants.

- Cultural Ecology (Kulturökologie)

The academic field of «Cultural Ecology» was developed in the 1950s and studies the general relationship between human beings and the environment. The concept of «environment» is closely related to physical nature as biology, geology or meteorology. The field also covers questions about how mankind or society interferes with nature or how cultures change natural environments. Among the

main founders were Julian Steward, who presented a «Theory of Culture Change» (1955), Fredrik Barth who researched «Ecologic relationships of ethnic groups» (1956) and Andrew P. Vayda who developed «An ecological approach to cultural anthropology» (1969).
Using on Cultural Ecology the Norwegian philosopher Arne Næss proposed the concept of «Ecosophy» or «Deep Ecology» (1973). With this «philosophy of ecological harmony» Næss tried to present a concept that combines the natural sciences and the ethical or philosophical dimension of how people should live with the environment or nature. This Ecosophy informed the environmentalist or «Green Movement» to a large extent in the late 1970s and early 1980s and introduced the notion of a balance between culture and nature.
The two American brothers Howard T. and Eugene Odum developed a more general approach to ecology. According to Hall (1995) Odum developed the following six scientific areas in relation to ecology: Ecological modelling, Ecological engineering, Ecological economics, Estuary ecology, and Tropical ecosystems ecology. Especially Odum's (1994) systems ecology with reference to general system theory could be relevant to describe a new «Cultural Ecology».

- Semiotic Ecology

The concept of ecology related to environments or nature is also visible in «Semiotic Ecology». Alfred Lang defines Semiotic Ecology as «a general conceptuality and methodology joining generative semiotic with the notion of ecology that living entities and their environment constitute each other in an open evolutive process» (Lang 1998). He describes Semiotic Ecology as a conceptual, systematic method for analysis of spaces as environments. Semiotic Ecology is used to understand ecological systems, in particular person-culture-systems (Lang 1997). A very similar approach was used by Ben Bachmair and Gunther Kress (1996; 1997), by Bovill & Livingstone (2001) and by Heinz Moser, Christa Hanetseder and Thomas Hermann (2006) to analyse and describe children's rooms as a way of understanding the relation between children and media.
With reference to the Odum brothers Kalevi Kull (1998) points out on the necessity of extending the understanding of ecology because «the relationships between humans and nature are connected to deep cultural processes». He therefore stresses ecosemiotics or semiotic ecology in order to understand «the semiotic mechanisms which determine the place of nature in different cultures». Kull and Nöth (2000) explain that «Ecosemiotics (or ecological semiotics) is the study of sign processes in the interaction of humans with their natural environment. This semiotic field at the crossroads of nature and culture is most closely related to its neighboring fields of biosemiotics, zoosemiotics, and cultural semiotics, but semiosis in the relation between humans and nature is also of concern to aesthetics, the visual arts, literature, hermeneutics, and theology.»

A different perspective on semiotic ecology is presented by Göran Sonesson (1999) and his attempt to describe the lifeworld as an ecology from the perspective of Peirce's semiotics. «Like Husserl's Lifeworld and Gibson's ecological physics, but unlike Greimas' natural world, semiotic ecology will suppose this particular level to be a privileged version of the world, «the world taken for granted», in Schütz's phrase, from the standpoint of which other worlds, such as those of the natural sciences, may be invented and observed. This world is characterised by a particular spatial and temporal structure, by types, and, by regularities» (Sonesson 1999, 9).

Media Ecology

The term Media Ecology was mainly shaped by Marshall McLuhan and Neil Postman in the mid 1970s in the USA. Marshall McLuhan encouraged Neil Postman to set up a Master programme on «Media Ecology»1 at the Steinhardt School of Culture, Education, and Human Development, University of New York. The «Media Ecology Association» (www.media-ecology.org) follows in this tradition.

The ecological environment within this concept is constituted by communication, dominated or mediated by media and technology. The ecology itself is the communicative environment of individuals or society. According to Neil Postman the purpose of media ecology is to explain the influence of technology on communication as well as the influence of new media environments that potentially change the way people think or organise their lives. The assumption is that media in the sense of artificial technology influence people and society in a negative way making them less capable and dependant on technology. (McLuhan 1964; Postman 1985)

McLuhan and Postman's concept of media ecology is considered not to be an empirical scientific approach but rather a philosophical one. It is not clear, furthermore, exactly how an ecology is constituted in this context in relation to the individual. Communication in the sense of a rather primal state is seen as the ecosystem which is spoiled by technology. The concept was thus not taken into account in central Europe.

One could even argue that the concept of mediatization (see above) opposes media and communication to culture and society, and that it thus stands in the tradition of Media Ecology. The authors further argue that research needs to study developments associated with media within mediatized worlds like family or school (Hepp and Krotz 2012, 13).

1 http://steinhardt.nyu.edu/dcc/masters/Media_Ecology.php [Nov 20th 2007].

Ecological Model of child development

Urie Bronfenbrenner is one of the most important developmental psychologists of the last decades and published his «Ecology of Human Development» (1979) impacting the social sciences, behavioural theories and pedagogy. His theory of social ecology from the 1980s was also the basis of a method set forth in Dieter Baacke's Media and Social Ecology Model in a German perspective. Bronfenbrenner's «eco-system» can be understood as the entire material and social environment. His concern was particularly the systematic interconnections of the family, the home, the school, the community and society in which people grow up. The individual is at the center of this model which forms more or less concentric circles around him or her, with the different types of eco-systems, which are related to Alfred Schütz's lifeworlds (dimensions of everyday life) are arranged in dependence on the intensity of the interaction of people in them, and the period of development:

- Microsystems cover the relationships to other people or groups,
- Mesosystems are the sum of the relationships (microsystems) of a child and the relationships between these microsystems,
- Exosystem is a system of relationships that the child does not belong to directly, so that they do not have a direct influence on him or her.
- Chronosystemes cover the temporal dimensions in the development of a child,
- The macrosystem covers all of the relationships in society including values, conventions, regulations etc.

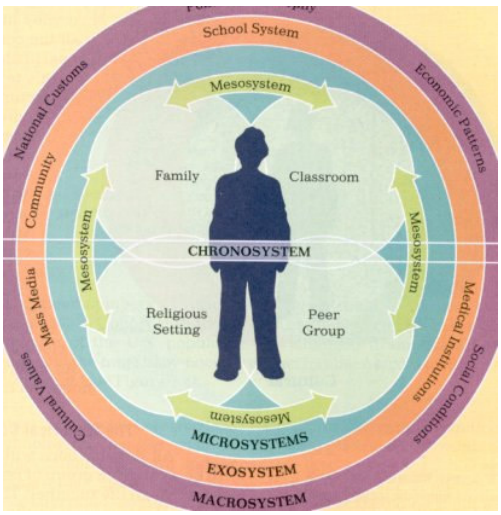

Fig. 2: Ecological Model of Child Development by Bronfenbrenner (Oconto Falls School District Community 2004, 4).

Newer models of ecologies – Learners within their physical, structural world

More recent approaches understand the physical world as including all living organisms, especially humans, as well as family, peers, teachers, third parties, etc. The structural world here refers to the structure of society, of the school system, of the school institution or of information mediated through technological resources. Considering the classroom as an ecological system is not uncommon and is based on the assumption that the effectiveness of the teacher is to be understood only within the context of community, family, school, and classroom. Additionally, the in-school performance of the students can only be explained within the ecosystem of the school. In particular the keywords school culture, school climate and classroom culture point out to this notion. Two of the most important representatives of this position are Chet A. Bowers and David J. Flinders (1990). Doll et al. (2004) argue in this spirit for a healthy class environment to support at-risk learners. Their hands-on book focuses on supporting the mental health and the school performance of students who lack social and emotional support. As part of the early research on mobile phone use of young people Grinter and Palen (2002) spoke about a domestic ecology with regard to the patterns of how the use of instant messaging is integrated.

The focus on individual systems, either within dominant ecologies or in single, related and adjacent ecologies, ultimately corresponds to Bronfenbrenner and his ecology model, which organized the subsystems according to their tasks and characteristics around the individual.

Information and learning ecology

A different and perhaps more useful approach to ecology is proposed by Nardi & O'Day (1999) as an «information ecology». They define an «information ecology to be a system of people, practices, values, and technologies in a particular local environment. In information ecologies, the spotlight is not on technology, but on human activities that are served by technology» (Nardi and O'Day 1999, 49).

Nicola Beddall-Hill explains the importance of this theory's

> focus upon the human practices that are served by technology, proposing that microenvironments such as hospitals and libraries are information ecologies. In these settings people, technology and other artefacts come together in congenial relationships that are driven by the values that are present in that ecology. […] Ecologies are used in a metaphorical sense to represent complex diversity where many relationships are taking place and most importantly they are continually evolving. They are a system which fit together. (Beddall-Hill 2012, 2)

In this context John Seely Brown (2002) assumes that the internet provides great amounts of writing, information and interest groups that act as resources for learning. He then introduces the term «learning ecology» and defines that:

> An ecology is basically an open, complex, adaptive system comprising elements that are dynamic and interdependent. […] Now recall our emphasis that informal learning often involves the joint construction of understanding around a focal point of interest, and one begins to sense how these cross-linked interest groups, both real and virtual, form a rich ecology for learning.

Frielick (2004) formulates this approach specifically for classroom teaching by stating: «the key idea is that teaching/ learning is an ecosystemic process of transforming information into knowledge, in which teacher-subject-student relationships are embedded or situated in a context where complex interacting influences shape the quality of learning outcomes. This perspective goes beyond constructivism, into a new ecology of cognition and learning». He further points out that to «understand this new ecology of learning, we have to ‹de-learn›. De-learning is a dual, synchronous process of deconstruction and enacting new understandings» (Frielick 2004, 328).

Ecology of Resources

The introduction of information and learning ecologies put the learner and the individual's learning clearly into focus. The learner is surrounded by and interrelated in practices with artefacts as well as information. Rosemary Luckin et al. (2005; 2008) substantiated this standpoint by formulating a learner-centric ecology of resources, which is «a set of inter-related resource elements, the interactions between which provide a particular context». The learner centric ecology of resources or the «learning context» has a static dimension through which the resources can be identified and categorized, and a dynamic dimension that describes the organizing activities that activate the resources.

Central foci are:

- The use of technology as a means to provide continuity across informal learning outside school and formal learning in classrooms by appropriate contextualization of activities across school and home contexts.
- The inter-relatedness of the resource elements, providing certain responsive contexts that need to enabled by organizing activities.
- Different settings and contexts that require learners to adopt certain strategies to act within these contexts and vice versa. Students create different contexts by using technology, information and resources in different settings.

Recent concepts of Ecology

More recently Digital Media Ecology has been used to describe the «relationships between new forms of education, mediated communication and cultural production as constitutive of a unitary media ecology» (Hug, Lindner, and Bruck 2006). More generally Michael Gieseke has described a new cultural and media ecology in his account of the transformation processes of media and written cultures (2002). In the perspective of German media education Media & Social Ecology (Medienökologie), has provided new means to understand the complex relationship between young people and their use of media in everyday life (Lange and Lüscher 2000; Ganguin and Sander 2006).

Media & Social Ecology (Medienökologie)

Andreas Lange and Kurt Lüscher (2000) use human and social ecology as the framework for their interpretation of the relation between television and children. Key concepts for their media ecological perspective are:

- The term «ecology» is used in two different ways: 1) Generally as description for lifeworlds that are meaningful for the development of people as biological, physical and social beings, and 2) for analysis of the relationships that develop between organisms and their lifeworlds.
- The term «human ecology» describes the lifeworlds that are relevant for the development of individuals, communities and societies on the one hand and the related scientific analysis on the other hand.
- Lange and Lüscher refer to social ecology in order to explain the relationships of individual people to wider social networks and systems. They include material and symbolic resources as well as restrictions. The concept and terms of social ecology used here are actually the same as Bronfenbrenner's, although this is not made explicit.
- Lange and Lüscher point out the importance of communication as mediator between individuals and their lifeworld. Insights gained from communication allow the creation of communication and media.
- The authors see media as ways of organizing human communication by means of technology and devices.
- Media ecology is thus seen as the part of media that is within the lifeworld as well as the analysis of consequences that the media have on the development of individuals and societies.
- The authors use «ecology of communication» to describe the collectivity of communicative processes.
- In parallel to social and media ecology the authors use «knowledge ecology» in order to describe individual and collective knowledge which people use to qualify the material and symbolic resources within social and media ecology.

In this scheme media are seen as an external influencing factor on children and their lifeworld. Lange and Lüscher's Media Ecology is not able to see the relation between people and media as an interwoven and balanced system.

Dieter Baacke's Media Ecology

The most recent text on media ecology by Sonja Ganguin and Uwe Sander (2006) reviews the concept of ecology by Dieter Baacke from the 1980s and 1990s. Dieter Baacke, who died in 1999, was one of the key players in media education in Germany. .

In their text Ganguin & Sander rely on Baacke, who in turn uses Brofenbrenner's social ecology (see section 2.3) to further explain children's and adolescent's social ecology. Baacke summarized Bronfenbrenner's categories of the macrosystem (micro-, meso-, exo-) in a concentric scheme consisting of an ecologic centre, a proximal ecological space, an ecological «cutout» and an ecological periphery. Relating the issue of media to the social ecological zones led to the approach of media ecology. The authors describe that within this scheme, as children grow up they get more and more in touch with the outer circles.

The *ecological centre* is closest to the individuals where children make their first experiences with media. This happens mostly in the home or family context. In this zone the child listens to the radio and to music, views television, eventually acquiring other media like a private television set and/or a personal mobile phone.

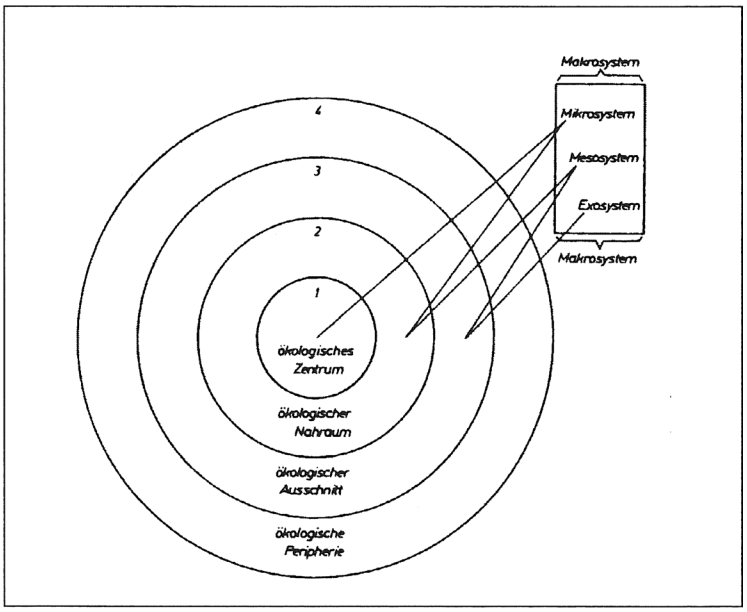

Fig. 3: Schematic order of the four ecological zones integrated in Bronfenbrenner's categories (Baacke 1983, 59; as found in: Ganguin and Sander 2006, 134).

In the next concentric zone, the *ecological proximal space*, peer activities take place. In a spatial sense this means leaving the family and stepping outside on the street or going to the neighbours to meet friends. The media use in this context might be listening to mp3 songs stored on the mobile phone or talking about media experiences. The authors point out that such leisure-time activities depend on the quality and availability of this space, the persons and parental activities, all which are often more conspicuous (sometimes by their absence) in less affluent neighborhoods. The «*ecological cutout*» zone designates places where functional tasks and relationships are defined. These are for example the school or the job. This zone is shaped by institutions and associated experiences, affordances and tasks. In relation to media use, Baacke distinguishes between *specific* media environments like cinemas, libraries, discotheques or internet cafés, and *non-specific* ones. These former are dedicated to a certain pattern of media use. The non-specific media environments in the ecological «cutout» are places that are not specifically dedicated to media use, but where media is still available like music listening or playing in a youth club or in a café.
The fourth zone with the greatest distance to the centre is the *ecological periphery*; it is characterised by casual contacts or occurrences like holiday trips. Media use also takes place in this zone and is highly relevant for orientation within other, outer socio ecological zones.
According to Dieter Baacke the variety and quality of the ecological zones is most important. The more enriched and versatile this variety and quality, the more open and widely-experienced children become. The more liberty of action, opportunities for communication and action that children are offered in each of the zones, the stronger their development. This becomes obvious with the example of impoverished or «marginalized» families who might not be able to offer children these opportunities or who are socially excluded from certain activities or who do not have access to certain media technology or networks.
The authors Ganguin and Sander state that the ecological model with its zones is just analytical and not empirical. The zones are not clearly and strictly separate form each other and overlap especially considering media use. The socio ecological zones by Bronfenbrenner and Baacke imply two dimensions: The dimension of child development and growth and the dimension of space. It seems unclear how these two dimensions are relevant for media use, especially for the use of mobile phones or the internet.

Consequences and tasks for education and mobile learning in schools

The aims of this review are to explore different concepts of «ecology» as it forms the basic metaphor for the Socio-cultural Ecology of mobile learning or «mobile complex». A further aim was to explore different meanings of ecology in the

context of learning and media use. The question with ecology often is: «What is in the centre and in which context does it take this position?» Among the results of this exploration are:

- In the various concepts of ecology there exists a certain differentiation between the system and nature. Although those are often subtle differentiations, some concepts have certain notions about natural states of communication and lifeworlds, or natural systems that used to work without technology.
- It needs to be stated that the notion of nature – in the sense of an unspoiled environment – should be transformed into a notion of the nature of an «ecology».
- Consequently, it might be useful to consider that it is an ecologies nature to be stable, but that ecologies are *systems that are about to change*. Ecologies are – if we want to speak of anything natural – subject to change by nature (Goddard and Parikka 2011).
- Ecologies are technical, social, cultural or spatial systems whose components cannot be deconstructed or be taken apart. Their elements are interdependent and closely inter-related.
- An ecological approach in education needs to put individuals in the centre. The relationship between the individual in the centre and the outside worlds can be characterised through reference to equilibrium or balance, correspondence and/or reciprocity.
- More generally, ecology needs to be seen as «dynamic interrelation[s] of processes and objects, beings and things, patterns and matter» (Fuller 2005, 2) «in a culture where the relation between materiality and information has been redefined» (Goddard and Parikka 2011).

Cultural practices of school learning and of media acquisition take place in different worlds or in different ecological zones / spheres. The cultural definitions of media in the context of entertainment and formal learning in the context of school have led to contradictory forms of learning (Bachmair 2008). In-school and everyday media use can be assigned to different zones of social ecology, with school taking place in the ecological cutout where other functional institutions are located and where specific tasks are to be solved. The non-specific media use takes place, according to Baacke, in the ecological centre and in the ecological proximal space. As agency in the context of everyday life joins with the structures of learning from school it is therefore necessary to identify structural relations between school and everyday life (Bachmair 2008) and to break the strict barriers between the socio-ecological zones in relation to school and media.
In other words, learning in school and media use in leisure time can be considered as different cultural situations each with its own set of cultural practices of learning.

The question for research and teaching design is then: How do children develop agency in certain cultural situations and what affordances are implied in certain cultural situations? Learning in school means obtaining competencies and skills at a common level, whereas media use in the sense of using cultural resources means to individually acquire a degree of agency in the world of consumption and entertainment outside school. This has certain implications and raises questions for the concept of «cultural resources». One question would be: «Can learning in school also be described as the acquisition of agency in the context of cultural resources?» Or: «How do cultural resources from outside school differ from cultural situations inside school?»

In both economic and instructional design terms, the word «ecology» implies a high degree of responsibility (Zacharias 1999; Bachmair 2008). This includes a commitment to protect learners from economic exploitation (Pachler, Bachmair, and Cook 2013, 35f) and respecting sustainability in the use of resources, providing open spaces for play and learning, and open choices.

Creating «reciprocity of mobile devices, everyday life and formal learning [means to acknowledge, K.R.] the naive expertise (of media use) in everyday life that students bring into educational situations. Assimilation means to recognize such naive expertise. Reciprocity as a basis for the assimilation of cultural mobile resources by formal eduction can be realized practically through a mobile investigation of schools as learning environments» (Pachler, Bachmair, and Cook 2013, 37).

It remains for teaching design and media education to connect and balance experiences with the phenomena and structures in the real world. In addition rich, versatile and open media environments and opportunities should be provided for children to experience for the sake of their development and critical reflection in all zones, contexts and situations.

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How to Define Media in a Mediatized Society?

A Media Pedagogical Proposal Inspired by Theoretical Ideas of Castells, Luhmann and Peirce

Bardo Herzig and Sandra Aßmann

Abstract

Learning processes of children, adolescents and adults do not only take place in formal contexts like school, but also in informal contexts, such as in the family or in one's peer group, or in non-formal social contexts like clubs. In many of these learning processes media play a significant role – as an instrument and as a subject for learning. Therefore it is an important task for media education to describe and analyze such processes and to formulate pedagogical consequences for learning with and about media. To realize this challenge, it is helpful and necessary to develop a definition of media which is adequate for learning in different contexts of a mediatized society. We discuss three theoretical approaches: a network perspective, systems theory and semiotics to help us to create an appropriate definition of media offers. We use an everyday life example (communication with and via Facebook*) to illustrate our argument.*

Introduction

Different theorists recognize the ubiquity of media in contemporary society. In terms of «Mediatization» (e. g. Krotz 2008) or «Mediatic turn» (e. g. Friesen and Hug 2009) scholars attempt to describe the transition of using media between former generations and the current one.

Nowadays, the everyday life of children and adolescents is interpenetrated by media. They use media devices to communicate, to be entertained, to inform themselves, et cetera. A life without media seems to be unimaginable. Media are incorporated in ordinary life. Young people are growing up in different environments, which offer different learning opportunities. Media play a special role in the formal and informal educational contexts of children and adolescents because media are an essential part of their culture with their families, their friends and within their schools (e. g. Livingstone and Bovill 2001). In many European countries there is a clear difference between high media access and frequent use at home, and minor access and less frequent use in schools, in particular in Germany (cf. Herzig and Grafe 2007; EuroMeduc 2009). All in all, there seems to be a gap between the media use in different educational contexts of young people, which is difficult to bridge. Currently, there is a need for further research about the media cultures and

Herzig, Bardo, and Sandra Aßmann. 2014. «How to Define Media in a Mediatized Society? A Media Pedagogical Proposal Inspired by Theoretical Ideas of Castells, Luhmann and Peirce». *MedienPädagogik* 24 (Educational Media Ecologies): 18–29. https://doi.org/10.21240/mpaed/24/2014.07.18.X.

practices of children and adolescents in formal and informal educational contexts and especially about how the gaps can be bridged and how the change in society's media culture can be integrated into schools (cf. BMFSJ 2005).
If we focus on these gaps from a media pedagogical point of view it is necessary to point out a clear understanding of «media» as well as a precise understanding of «contexts».
Therefore, we present a definition of media which is sustainable for both, analog and digital media (Herzig 2012). This definition is interdisciplinary. An important condition is the possibility to describe elementary processes of computer sciences as semiotic processes. Software development is one example that is adequate to illustrate this assumption.
The theoretical basis of the definition consists of Peirce's ideas about semiotics and Luhmann's sociological systems theory. Media (devices and products) can be characterized as patterns, which are readable as signs. These patterns are able to offer cognitive systems the potential of creating meaning and producing knowledge. On the one hand they are inscribed in technology or materiality; on the other hand they can be presented, saved, broadcasted or manipulated with technological support.
To analyze the gaps between learning in formal and informal contexts we apply this definition of media on a specific understanding of contexts. We concentrate on the interpenetration of contexts as networks by Castells on one side and the perspective of contexts as socials systems by Luhmann on the other side. In this way, we create a theoretical framework that allows us to do research on acting and learning with media of children and adolescents in their everyday life.

Media in an Everyday Life Situation

Today's students and teachers do not only meet each other in school or occasionally in private (e. g. downtown). Nowadays they have many possibilities to meet in the virtual world, especially in social networks like *Facebook*. There are different ways of dealing with this development. In Germany there are few official recommendations for teachers how to behave. It depends on the federal state. Some states like Baden-Württemberg or Rhineland-Palatinate do not allow teachers to use *Facebook* in school contexts. The German Teachers' Alliance has not currently offered guidelines. They only give advice to be cautious. Some schools develop rules for their teachers: For example, creating a second profile on *Facebook* in case one would like to be connected to students.
In our paper we do not want to discuss different advantages and disadvantages concerning a friendship between teachers and students on *Facebook* (although it would be an interesting discussion, obviously). Our intention is to analyze processes like this from a media-theoretical point of view. Therefore we are wondering which

definition of media (devices) can be useful to describe and explain such everyday occurrences as friendships between teachers and students on a social network site. For this purpose we would like to focus on three theoretical approaches:
We regard the situation from a network, a systemic and a semiotic perspective. Of course, this might only give us food for further thought. We concentrate on these three concepts in order to develop a definition of media

– that fits for media in the Information Age
– that focuses on the individual *and* the structure
– that includes analogue and digital media.

In the following we discuss these approaches and point out their use for describing media offers from each specific theoretical point of view. In addition, we illustrate the analysis by using our example of Facebook. In conclusion we develop a definition of media offers that is based on the three discussed theoretical ideas.

Theoretical approaches

a) A network perspective

What is the specific benefit of reflecting media from a network perspective?

In his concept of a network society, Manuel Castells (2000) describes changes in our society: Cultural, economic and political factors led to the power and efficiency that characterize today's networks, for example financial networks. In this understanding networks form the basic units of modern societies. They consist of nodes that are interrelated (Castells 2001b, 432). Nodes can be persons, groups, social movements or enterprises, for example. Thinking in networks means a focus on structures *and* on processes. Information flows circulate simultaneously and independently from spaces or territories. Networks are open structures and able to add or remove nodes, according to the goals and rules of the network (Castells 2011a, 528; Castells 2005, 7). Networks are not new organizational forms, but digital technologies have changed the character of networks: They became more flexible and adaptive (ibid., 4). According to this concept, traditional institutions, like school, are confronted with these developments and must react. The network society requires an adequate concept of school. «School at the end of the culture of the book» (Böhme 2006) or school in the «Internet Galaxy» (Castells 2001a) must differ from the concept of school that was established in the Industrial Age. Digitization of society influences pedagogical approaches. Inclusion and exclusion are the dominating network operations (Castells 2004, 3). The perception of space and time has changed in the network society. Information and communication technologies, especially the Internet, led space to become a «space of flows» and time a «timeless time» (Castells 2004, 55 ff.). Social networks are communication structures.

What is the specific benefit of Castells' approach regarding our scenario?
Networks based on information and communication technologies constitute the new social morphology of our society. Social network sites like Facebook are a typical sociological phenomenon. These sites offer people the ability to meet and to connect with others, or rather their profiles. A social network site is based on technical structures.
According to Castells, a confirmed friend request can be interpreted as a relation between two nodes. This possible connectivity only exists within social networks. In other words, only networks make this form of connectivity possible. It cannot be found in an institution like today's school. But a crossing of boundaries seems to be necessary because children and teenagers use information and communication technologies in their everyday life. In a network society, schools no longer have a monopoly on Bildung (Siemens 2005). To survive, schools must become nodes (or even hubs) in globally connected knowledge fields. Faßler describes this kind of development for universities. (Scheibel 2008, 87).
After introducing a network perspective on media we continue with a systemic approach, which also focuses on the social structures.

b) A systems theory perspective
What is the specific benefit of reflecting media from a systems theory perspective?
Niklas Luhmann's (1984; 1988) systems theory perspective draws attention to a special way of modeling communication, which is different from our everyday life understanding of communication, e. g. face-to-face communication between people. This perspective allows us to analyze and to explain communication in technically supported networks in mass communication.
Luhmann (1984) observes and describes, in terms of his approach, communication processes from a macro perspective. His system-related perspective shows that communication within a system follows certain rules. A basic assumption observes society as a social system, consisting not of individuals (subjects), but of communication. Correspondingly in these communications, individuals are not involved, but systems, to be more precise psychic systems. Following that, communication does not take place between people, but between communications (31).
For Luhmann, communication is a process of three selections or rather a synthesis of three selections (ibid., 195 ff.). Understanding is the ability to differentiate between information and utterance. The first selection refers to information. This means that person A (a psychic system) decides to understand something as information. The second selection refers to the decision to transmit the information. This transmitted information can only be understood by a person – called B – if B can

distinguish information and utterance, which means that B has to select again (third selection). This «understanding» is not a psychic understanding, but only refers to the selection. This means, that B does not necessarily have to act. It is a selection independent of the understanding.

These contingent selections regarding communication initially make it seem rather improbable for communication to take place. In his theoretical approach Luhmann reduces this improbability through media and distinguishes language, media of dissemination and symbolically generalized communication media (ibid., 220 ff.).

Language's task is to make the understanding of communication more likely. It widens the scope of communication possibilities beyond mere perception and makes it possible to connect psychic and social systems.

The media of dissemination shall remove restrictions of communication regarding time and space and, thereby increase the addressees' reachability. Examples of dissemination media are writing, printing and electronic broadcasting, which were developed on the basis of language. On the one hand the technology of dissemination media widens communication's scope of action enormously. On the other hand every technology selects and restricts which communication can serve as a basis for further communication (ibid., 221).

The function of symbolically generalized communication media is to arouse motivation to accept communication to ensure success. Symbolically generalized media are media that use generalization in order to symbolize the connection of selection and motivation to depict it as unity. Important examples are: truth, love, property/money, power/right. Though quite differently, all cases are about selecting media so that they additionally function as motivation and thus make sure that the selections offered are accepted. For this reason, Luhmann introduces so called media codes which pre-structure communication and define standards for continuing communication. This makes it possible to assign communication to different fields and motivate the addressee to accept the selection offered to him. Incidents occurring within the environment of a system must be classified as coded/uncoded, because in a communication process only coded incidents work as information and all others are disturbances or noise. The probability to accept a communication increases if the relevant information is coded with the system's own code. The code is a binary scheme (e. g. true/ false in the science system; payment/unpayment in the economical system, …).

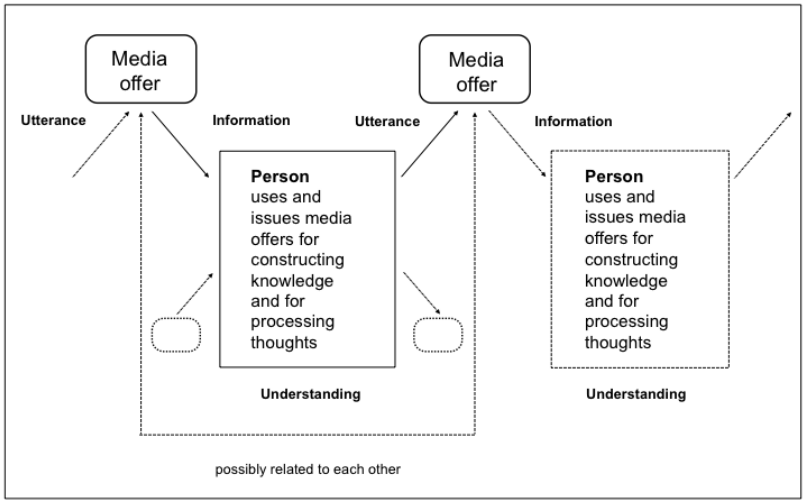

Figure 1: Communication as process of selections.

As shown mediatized communication processes can be characterized as a synthesis of selection processes. We perceive information from our environment, process it, and offer it in the form of media products (utterance). Other participants can understand the offers to select by distinguishing between utterance and information. This process can be continued. The communication's participants do not directly communicate, except, for example, via media offers. These media offers are coded as «potential signs» (see below), hence participants must refer to collective knowledge to decode the communication.

What is the specific benefit of Luhmanns approach regarding our scenario?
Referring back to our *Facebook* example, an analysis based on systems theory shows two results:

– Systems theory describes communication as communication between communications. In a social network, like *Facebook*, one can observe that people fade from the spotlight and the media offers come to the forefront. Profiles function as media offers and selections are made by users or possibly by technique. Thus the process of uttering and accepting a friend request is a process of technically supported continued communication.
– In the social network, different types of communication are processing. Facebook is a virtual environment that is no longer an unstable system of interaction (like meeting someone on the street), but shows characteristics of a stable interaction system. Facebook is not a social network that targets a specific target group (like *Xing* or *LinkedIn*). This means that Facebook is not actually a network, in which people's professional roles are important.

However, by discussing topics that usually come from an educational system (for example, discussions about Facebook profiles) it addresses people in their professional roles (as teachers and students). Friend requests, which address the communication partner only as person in private and not within their professional role, are opposite to this observation. Personal expectations, role expectations, program specific expectations and expectations due to values overlap and mix. This makes the connecting communication difficult. Simultaneously, it would be worth considerating how a social system should be to facilitate connecting communication.

System theory allows the world to be divided into differentiating communications to describe a reduction of complexity. Communication distinguishes itself by talking about one topic, but keeping silent about every other topic (Luhmann and Fuchs 1989, 7). Certain topics or guiding differences determine communication, organize discourses and are an expression of different perceptions of the world. These can be established as subsystems, which, with the help of mass media, primarily conduct their own operations, e. g. publishing posts within social networks. Luhmann calls this phenomenon the «reality of construction» (1996, 13). On the other hand, these messages appear as reality for others - this is the construction of reality. Mass media as observing systems are compelled to construct reality «namely in contrast to the own reality another» (1996, 18). At that point, reality is not considered to be an object, but a horizon. Parallel worlds and their demands for validity are characteristics of subsystems, whose communications underlie different guiding differences, with specific distinctions. Hence, there are communities within the mass medium World Wide Web, which follow the guiding differences education, movement, entertainment, hobby, work, health, etc. They develop an independent existence and connect communication with existing communications.

The theory of autopoietic systems enables a description of the formation of social systems and how they develop, how communicative complexity is reduced, and which part of that is taken by media. Within this view, the participation of a subject is neither necessary nor possible. However, the subject is not basically denied, but society is subordinated by a perception, an observation!), in which the subject is not matter of the consideration referring to an anthropological understanding. This system theoretical perspective describes the attempt to make the complexity of the world comprehensible, and in this case it does not mean to consider every single subject, but to formulate systems and ask for their functions and conditions.

Wherever we are concerned with communication and media offers we are concerned with signs. Therefore it is important to describe media and communication as sign patterns and sign processes. We use a semiotic perspective to do so.

c) A semiotic perspective

What is the specific benefit of reflecting media from a semiotic perspective?

The relation between media offers and technique can be described – in the chronological development of technical artifacts – with, the help of semiotics. Even software engineering can be understood as a sign process (Herzig 2001; 2004; 2012, 139 ff.). We will focus on the first topic and shortly introduce Peirce's concept of signs (Peirce 1966, p.228) before we interpret the *Facebook* example referring to this approach.

To describe Peirce's concept of signs we use an example: Imagine you read the word «FRIEND» on a screen. In Peirce's understanding you recognize a sign consisting of three elements, called the triadic relation.

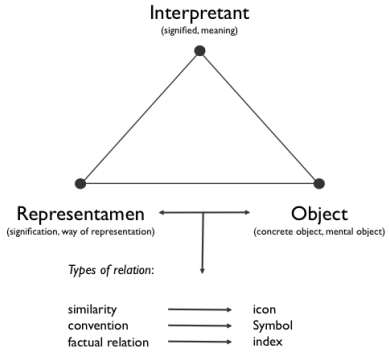

Figure 2: The triadic sign relation according to Peirce.

The representamen is the physical part of the sign, for example, the pixels on the screen. The object is what the sign represents. In this case «friend» can represent a particular person or the idea of a friend, understood in its original (everyday) meaning. The interpretant is developed in the interpreter's consciousness, his understanding of friend or friendship, his experiences with friends or particular friends and so on (1966, 277).

One of Peirce's central statements is that a sign is not a sign if it is not interpreted as such. For that reason we speak of possible signs (ibid., 179).

Regarding the relation between representamen and object, Peirce differentiates between icon, symbol and index (Peirce 1991, 64). Whereas iconic signs (e. g. a photo from a building) have a strong similarity with their object (in this case, the building itself), symbolic signs (e. g. a written text) can only be understood when knowing the specific underlying conventions (in this case, the specific language). Finally, indexical signs (e. g. smoke) have a causal relation to their object (in this case fire) (cf. figure 2). With the help of these types of signs, media offers can be described and differentiated in an analytical manner.

What is the specific benefit of Peirce's approach regarding our scenario?
According to systems theory, social systems consist of communication in which media offers function as selection offers. These offers are inscriptions into language and technology. Peirce's approach allows analyzing these inscriptions, meaning to analyze language as sign system and its use, and to analyze the relation between signs and media as technological artifacts (for examples, see Herzig 2012, 139 ff.). By distinguishing different types of signs we can understand media offers, just like *Facebook* profiles and threads as symbolic and iconic signs. A micro analysis makes it possible to further interpret the single signs as expressions of communication in different systems, for example, youth language and language in professional contexts use specific icons, abbreviations or specific words tailored to the particular group. Referring to cultural studies, we chose a wide text concept as the basis since we find it in *Facebook* communication referring to symbolic and iconic signs (Barker, 2012). Peirce's approach further allows analyzing friend requests regarding their different meaning. In his approach, Peirce differentiates between a dynamical interpretant and a final interpretant (cf. fig. 3). The dynamical interpretant is further divided into emotional, energetic and logic interpretants. With regard to a friend request in a social network, the emotional interpretant can be seen as the effect of the sign on an emotional level (Hoffmann 2001, 16), for example, in feeling of joy at the interest of a member in the community. The emotional consequence is accompanied by an energetic impact, the confirmation of the request. In that case, the logic interpretant is the construal of the friend request as a sign of interest by another person in oneself, because the other person rates one interesting, likeable, etc. The final interpretant only appears as a logic interpretant, and describes the common meaning of a sign. In case of the friend request the difference between dynamical and final interpretant points out the presumption of the request being a 'real' friend request. This is possibly misleading, since the circumstance that anonymous requests are typically based on information from databases of social networks, which are publicly accessible. In comparison with the common sense of friendship, it is emphasized that the usually linked characteristics of sympathy, trust, shared experiences do not normally apply to the concept of friendship in social networks.

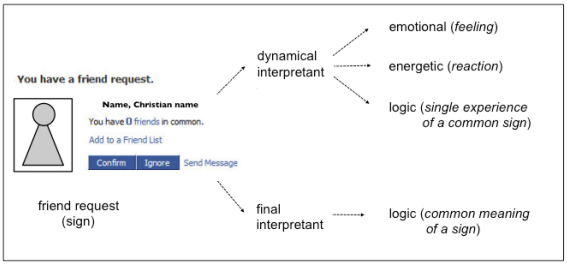

Figure 3: Proper significant outcome of a sign: dynamical and final interpretant (Peirce 1966, 8; Hoffmann 2001).

Media definition and conclusions

Digitalization, networking and communication are central concepts in the Information Age. According to this observation, we chose the theoretical approaches of Castells, Luhmann and Peirce to show and discuss their use and range for describing and explaining acting with and via media in a mediatized society. Our definition of media fits for the Information Age, and focuses on the individual *and* the structure, and includes analog and digital media. This definition of media offers is a useful basis to describe media-related learning-processes in formal, informal and non-formal contexts. The definition is compatible to discourses involving digitalization, networking and communication.

We define media offers as follows:

- Media offers are sign-enabled patterns inscribed into technical devices or material, and/or presented, saved, arranged, copied, transmitted or processed by technique.
- Communication processes are defined by offering and accepting selection-offers, in other words media offers, as well as by synthesis of information, utterance and understanding.

As a conclusion we are now able to analyze our *Facebook* example from a media-theoretical perspective by using the developed definition:

A friend request on a social network site like *Facebook* is a sign-enabled pattern (words and icons) transmitted and presented by technique. A participant, in this case a *Facebook* user, assigns meaning to the sign arrangement in a communication process, by offering and accepting requests on the social network site. Furthermore, it is defined by synthesis of information («You have a friend request.»), utterance (somebody wants to connect to somebody) and understanding (it is possible to confirm or to decline).

This analysis shows that a small phenomenon like a friend request is a complex communication process. It becomes obvious that whether teachers and students should become friends on social network sites like *Facebook* (cf. Chapter 1) is not very easy to answer. We must take into account that we live in a society that is determined by information and communication technologies, and that is structured in and by networks. From a pedagogical point of view we must weigh the disadvantages and advantages carefully. Therefore, we need to understand the cultural, social and technical processes that occur by using media offers today. Our definition of media according to the ideas of Castells, Luhmann and Peirce is a step in this direction.

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Mobile Learning

Structures, Concepts and Practices of the British and German Mobile Learning Discussion from a Media Education Perspective

Judith Seipold

Abstract

As a scientific field within media education and educational sciences the research on and the practical implementation of mobile learning is evolving. An analysis of the predominantly British scientific process of the mobile learning discussion – to which this paper refers to (Seipold 2012) – is opening the view to a taxonomy of this discussion, its contexts, reference points, perspectives and conceptual focal points, as well as to success stories and challenges that are related to the implementation of mobile learning in formalised learning contexts, such as schools.

Introduction

In formalised learning contexts such as school, mobile learning is realised in multiple ways. For example, mobile technologies are used as replacement for analogue media and technologies. The use of different functionalities of mobile devices are widening the learners' scopes of action. In addition, the use of devices that is dependent on specific situations and the devices' functionalities support learners in constructing user-generated contexts and so forth. Whilst research on mobile learning is dedicated to activity-oriented use in practice, and the theoretical engagement with this issue considers mainly constructivist approaches to learning, the scientific process of the mobile learning discussion is hardly reviewed and structured yet.

The following taxonomy that appears in relation to the scientific process of the British and partly the German mobile learning discourse and that is related to media education and educational sciences (see e.g. Seipold 2012b) is incomplete, but it refers to findings, insights and consequences for the development of theories, for practical research and for the implementation of mobile learning in formalised school-related learning contexts. The British mobile learning discussion serves as an initial point for this analysis, because in the U.K. mobile learning is researched systematically, and with a view to formalised learning contexts for almost 15 years (for an overview of some of the early European pioneer projects in mobile learning see below as well as Seipold 2012b). In the following, an overview of contexts, reference points, perspectives and theoretical foci of the current

Seipold, Judith. 2014. «Mobile Learning: Structures, Concepts and Practices of the British and German Mobile Learning Discussion from a Media Education Perspective». *MedienPädagogik* 24 (Educational Media Ecologies): 30–52. https://doi.org/10.21240/mpaed/24/2014.08.15.X.

discussion is provided. This overview originates from the British mobile learning discussion, from successful use of mobile technologies in school contexts, and from resolving challenges that occur during the implementation of learning with mobile technologies in schools. As a start, a review of the basis of research on mobile learning, including defining mobile learning and its goals is provided.

Mobile Learning is ...

The intention to describe mobile learning according to current literature leads to a list of terms and characteristics (Kukulska-Hulme 2005). Mobile learning is characterised as being «spontaneous, personal informal, contextual, portable, ubiquitous, and pervasive» (ibid., 2). «It can be informal unobtrusive and disruptive» (Kukulska-Hulme and Traxler 2005, 42), as well as «ambient» (Kukulska-Hulme 2005, 2). It is «highly situated, personal, collaborative and long term; in other words, truly learner-centred learning» (Naismith et al. 2004, 36). Mobile technology allows immediate and ubiquitous interaction (Kukulska-Hulme 2005). By doing so, mobile technology enables learners to learn beyond «schooling practices, in which what is being taught is abstracted from its naturalistic (ecological) space where it has real function with the world» (Pachler 2010, 154). Despite attempts to define mobile learning as exactly as possible there does not currently exist a definition of mobile learning that is generally accepted. In fact different definitions point to different fields that mobile learning comes from and refers to, as well as to the disciplines that are related to mobile learning. Also, such characterizations show the current state of research, the current developments within the mobile learning field, and the specific rationales for the legitimization of mobile learning. This results in the description of mobile learning as, for example, mobility of contexts, as mobility between contexts, as mobility of learning processes, and it results in definitions which base on learning theories that focus mobility, efficiency, technology, that consider social structures and infrastructure, and that describe mobility as mobility of expectations (Pachler 2010; Seipold 2012b; Sharples, Taylor, and Vavoula 2005; Traxler 2009).

Mobile learning aims ...

Accordingly, the research intentions of media education and educational sciences should be evaluated. The mobile learning discussion indicates that mobile learning can be a reason to have a look at technology, learners, teachers, contexts, concepts, learning contents, teaching design / didactics, ways of learning, places and times for learning, social developments, the educational system, and so forth. Authors write about learner centred learning (Luckin et al. 2010; Naismith et al. 2004; Traxler 2009), opening of schools for learners' everyday life (Pachler, Bachmair, and Cook 2010), learning during leisure time (Naismith et al. 2004; Sharples, Taylor,

and Vavoula 2005), learning as filler (Sharples, Arnedillo-Sánchez, Milrad, and Vavoula 2007, 3), about «new» learning (Naismith et al. 2004, 36), about the shift of power levels in relation to access and distribution of knowledge (Luckin et al. 2010), as well as about the democratisation of learning (ibid.). As a result, mobile learning sometimes seems to be a welcome opportunity to question education, formation (Bildung), pedagogy, the educational system as well as current concepts of teaching and learning. This might be a reason why protagonists of the mobile learning discussion sometimes seem to be paradigmatic with their statements and claims.

A taxonomy of the mobile learning discussion examined from a media education and educational sciences perspective

The existing scientific process of the British and German speaking mobile learning discussion can be reviewed to understand the discourse that shape mobile learning as an issue and as a research field, and to deduce results that scrutinise the current state of the mobile learning discussion critically. Also, by providing a taxonomy, it is possible to justify the foundation of mobile learning research (i.e. contexts of the discussion), to comprehend the discussion's self-created basis of legitimation (i.e. argumentative patterns constituting the discussion), and to frame the structure of the discussion (for details see Seipold 2012b).

Contexts of the mobile learning discussion

As an interdisciplinary field the research on mobile learning is connected to disciplines, fields and topics such as technology enhanced learning, media didactics and sociology. Research on media use in everyday life, as well as e-learning, shape mobile learning and serve as the contexts of the discussion. Key players in the discussion who define topics, theories, models and concepts are located in the UK. There, big and costly projects dealing with practice and action research were realised at the beginning of the 21st century. Such projects provide the basis for assumptions which are now commonly accepted within the mobile learning community.

– *People, institutions, conferences*: For a long time within a central European context, the research based in the UK was ground-breaking for the research on mobile learning in school contexts. Key players of the British mobile learning discussion focussed on shaping the field of mobile learning with views on media education and educational sciences, and related disciplines. Efforts were made to define and develop mobile learning on a theoretical and conceptual level, as well as implement it. Indicators of the continuation of mobile learning are the interest of research institutions in this topic, as well as the growing number of national and international conferences, and the foundation of associations,

institutions and special interest groups that are engaging in mobile learning (for details see Pachler et al. 2010; Seipold 2012b).

– *Practice oriented basic research*: On the basis of large-scale projects such as the Palm Education Pioneers project (http://palmgrants.scri.com), MOBILearn (http://www.mobilearn.org), m-learning project (www.mlearning.org/archive/index.html) or HandLeR (Handheld Learning Resource; www.eee.bham.ac.uk/handler) possibilities for practice were evaluated. Acceptance amongst teachers, learners and decision makers was appraised and options of opportunities in school, as well as the active, networking and constructive role of learners were explored. Questions related to the increase of learning efficiency and self-development of learners in school contexts was worked on; and the options to personalise technologies, ownership of the devices as well as the acknowledgement of applications that are used in everyday life contexts were analysed (for details, see Seipold 2012b).
– *E-Learnin*g: E-Learning is often referred to as the «original» reference discipline of mobile learning (Auer, Edwards, and Garbi Zutin 2011; de Witt et al. 2011; del Mundo 2009; Ernst 2008; Sharples 2007; Traxler 2005; Traxler 2009). Besides making learning contents available via digital technologies and the continuation of desktop-centred e-learning, e-learning is relevant for mobile learning because new opportunities for the autonomy of mobile learning are originating from the dissociation of mobile learning from e-learning. The possibility to personalise technologies and learning with mobile technologies is often given as an example (Benedek 2007).
– *Sociology*: In Germany, Austria and parts of Switzerland, sociological research on the use of mobile devices, mobility and societal implications of mobile communication has to be seen as basic research that considers the media use in everyday life. By doing so, Sociology provided a basis at the beginning of the 00s already which allows to connect mobile learning to the use of mobile technologies in private and public spaces and to discuss consequences resulting from this use (Glotz et al. 2006).
– *Media use in everyday life*: From the perspective of an ecological approach of mobile learning it is important to gain an understanding of the structural conditions of society and technology (Bachmair 2009a; Bachmair 2010; Pachler et al 2010) as well as understand how people are dealing with convergent technologies in their everyday life: Users cultivate (basing upon their agency) cultural practices, which can be described as routines, and which are basing on activities such as the organisation of their everyday life and social relationships. Such routines must be viewed in the context of specific situations. Examples of these routines might be the exchange of information or the ritualised communication amongst peers, as well as learning or the

experienced organisation of everyday life; also expertise and competences are exercised in relation to cultural practices. These practices are important for the implementation of learning with mobile technologies and for learning in general, because they can be considered central to the background of the learners' everyday life, as subjectively meaningful and as meaningfully cultivated and positioned. Thus, mobile learning is effective in reaching learners that are more challenging to reach in traditional school contexts (see Joint Information Systems Committee [JISC] 2008; Pachler, at al. 2010).

Argumentative reference points of the mobile learning discussion

Learners, schools, educational systems, learning processes and societal conditions (or, seen from a socio-cultural ecology perspective, an interplay of these components) are serving as reference points and foci of research within the mobile learning discourse (see Figure 1). However, it is the learner who is considered as standing in the centre of his or her learning activities and his or her structures. Claims that are articulated in this relation are important markers that point to what *learning* – not just *mobile learning* – should be in the background of our information and knowledge society, and which role people, institutions, resources and contexts that are involved in learning and the learning process can and should play (Seipold 2012b; Seipold 2011a; Seipold 2011b):

– *Technologies*: At the beginning of the discussion, mobile learning was strongly focussed on technologies, which were considered enablers for personalised and collaborative learning. Besides, technologies are – in a less technology centred viewpoint – understood as being infrastructure, tool and resource for learning and meaning-making.
– *School system and school*: Learning by using mobile technologies should result in a school system that is open for resources from the learners' everyday life, for example, their knowledge, expertise, information, interests, practices and so on. These resources should be integrated into classes and learning. By doing so, schools will become innovative, enabling and supporting the independence and democratisation of learning and learners.
– *Learners*: Learners are entitled to freedom, which allows them to learn in self-responsible, creative, formative, competent, networked, sustainable and life-long ways. This freedom implicates responsibility that can finally result into negative results, for example, when frameworks are missing which provide orientation and classification to learners to transform their subjectively shaped learning into objectively shaped school learning.
– *Learning process*: Because learning is no longer teacher centred, learners are entering learning processes that are characterised by discourse related, communicative, equal, collaborative, networked and enabling structures.

Thus, learners have equal rights in their learning process. Hierarchies shall be removed and equalised as far as it helps learners.

– *Social conditions*: Research on mobile learning often does not cover all of the above aspects in a connected manner, even though technological developments as well as appropriation of structures and cultural practices cannot be separated from their specific social conditions. Cultural practices can be characterised as unstable, shaped by different cultures, and as subjectively realised ways of experiencing the world around us. These practices are consumer-orientated, globalised, and community orientated. This must be considered when working with people from different social backgrounds, for example.

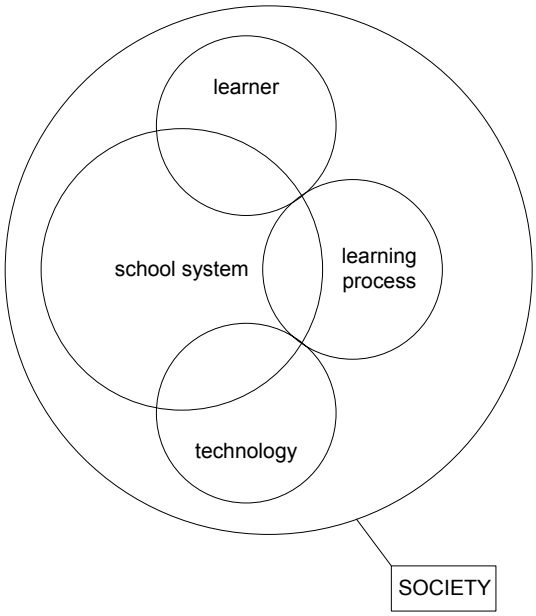

Figure 1: Argumentative reference points in the mobile learning discussion (Seipold 2012b).

Argumentative patterns shaped by people involved in the mobile learning discussion provide the basis for the legitimization of the mobile learning discussion

When looking at the argumentative patterns that are relevant for the mobile learning discussion of the last thirteen years (see Figure 2) it appears that on one hand the implementation of mobile technologies in formalised learning contexts, such as schools, does not work seamlessly. However, on the other hand, mobile learning is not limited to a technology-centred view but it encompasses didactic aspects, as well as learning that is evolving. These patterns provide a legitimization basis for mobile learning by referring to different dimensions:

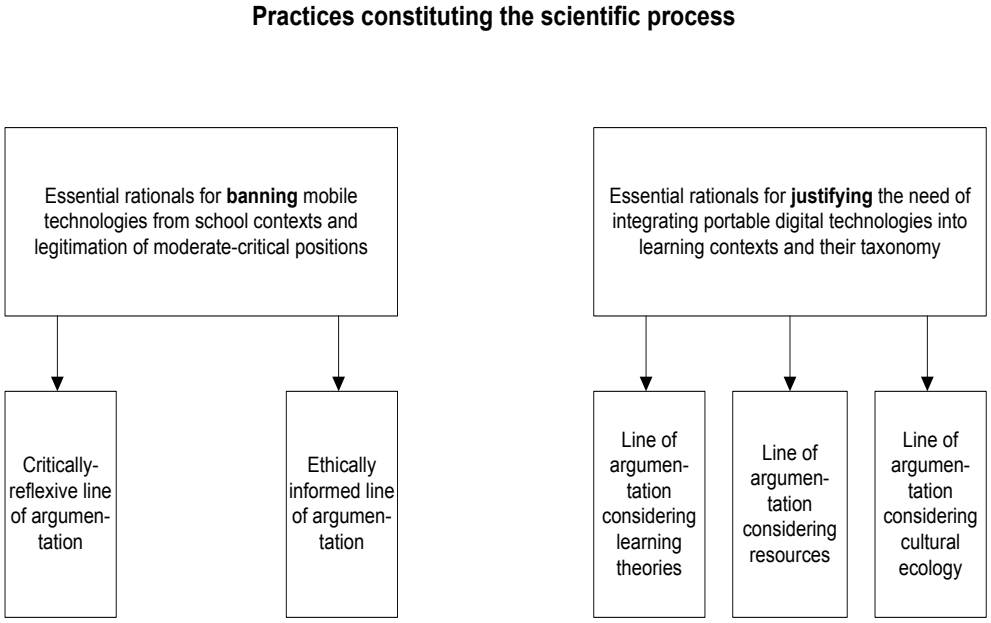

Figure 2: Argumentative patterns related to the constitution of the scientific process of the mobile learning discussion (Seipold 2012a).

Those who oppose mobile learning initially argued for a ban of mobile technologies in school contexts. This strict position was gradually replaced by a moderate position that can be described as critically-reflexive and empowering. In this connection, often an ethical line of discussion appears. The advocates of mobile learning refer to one line of argumentation that is related to learning theories and to one line that argues in regards to resources and socio-cultural ecology. Learners and learning processes, as well as an understanding of media use, which is considered to be subjectively meaningful to users / learners is central within this approach. These subjectively shaped aspects must be linked to objective frameworks and guidelines of formalised school learning – or vice versa (Seipold 2012b):

– *Critically-reflexive line of argumentation*: This line of discussion primarily results from the first affective discussions around the use of mobile technologies in and out of school contexts. It is typically a reaction to the concept of mobile technology as a problem. Initially mobile technology was a taboo subject in classrooms or on school property, however proponents developed protection of minor policies and showed positive use of mobile technology in working groups and extracurricular activities (Alfred-Teves-Schule 2008; medienbewusst.de – kinder. medien. kompetenz 2009; Medienpädagogischer Forschungsverbund Südwest [mpfs] 2013). Such activities and offers favour a practical approach

with the goal of enabling learners to responsibly use technology. Also, these activities contribute to regulated acceptance of mobile technologies in school contexts and in everyday life.

– *Ethically informed line of argumentation*: The ethical dimensions within the mobile learning discussion are also related to the research on mobile learning (Wishart 2010; Wishart 2011). This area is cultivated with the intent to protect personal rights of people engaged in research projects, and also questions concerning copyrights and issues, such as rights to personal photographs, sounds, learning materials, etc. are considered. Here, one of the central approaches is to consider such ethical standards in advance and to work these rules out collaboratively (Traxler 2010).
– *Learning theories-centred line of argumentation*: Learner centring, interaction, flexibility and sustainability in the learning process are the focal points in the line of argumentation that is related to learning theories. Useful in this context are possibilities of personalisation of devices that allow the adaptation to the learner's specific needs (Naismith et al. 2004) and expertise. In this regard there is not a primary focus on teacher centred learning, examination centring or assessment. Thus, learning becomes more and more activity centred and free from traditional forms of transfer of knowledge.
– *Resource-centred line of argumentation*: The availability of resources as well as infrastructural equality in the learning process and the educational system are issues that have relevance for those debating the resource-centred line of argumentation. Basis of the issues regarding the availability of resources in general and the concept of providing equipment top-down (see below). This is because by providing resources such as mobile devices to learners, it is possible to establish an equality of opportunity, and social disadvantages related to equipment can be balanced (Benedek 2007).
– *Cultural ecology-centred line of argumentation*: Within this line of argumentation, technologies are initially examined based on the use of media in everyday life, and are seen as tools for learners to organise their everyday life. But, supporters of this line of argumentation are losing their key position within the argumentation complex: Technologies are taken up in technological and social structures that are surrounding learners and are designed and organised by learners. This is because mobile technologies are considered to be resources within the process of appropriation. These resources can be used for access to and production of a variety of activities, structures, contents and knowledge. By handling the mobile devices, learners cultivate agency and cultural practices which can be taken up by school and which can serve as «conversational thread between informal learning in everyday life and curricular learning» (Bachmair 2009b, 1).

Structure of the scientific process of the mobile learning discussion

Besides contexts, argumentative reference points and argumentative patterns, it is finally a course that is structured on two levels by phases and development lines which result from the systematization of the scientific process of the mobile learning discussion. The phases give the scientific process a chronological sequence (horizontal). The development lines structure the scientific process vertically and can be described as topics (see Figure 3). But these topics cannot be limited to single phases; topics form phases at a certain time more or less intensively, and by doing characterize certain phases.

– *Phase 1 Exploration* stands for exploring the research field with a focus on technology-centring, learner-centring and content-centring when implementing mobile technologies and applications in school contexts. The attempt to integrate mobile technologies as resources and as enablers of mobility, connectivity and activity in school lessons, thus adding technologies onto already existing structures and to further integrate them into curriculum and learning processes (top-down approach) characterize this phase. The development of applications (software) for learning and the aim to make learning contents available that are developed for mobile technologies are also part of this phase and are rooted in the tradition of technology enhanced learning. In this regard, central and characteristic of the early phase of mobile learning research is the question of how to integrate school learning into the learners' everyday life. Mobility and efficiency are central reference points. Also within this phase The personalisation of technologies, as well as particular learning theories that can be considered as being basic for learning with mobile technologies, (Naismith et al. 2004) gain relevance. Also, basic research is part of this first phase: Theses and assumptions are formulated which try to provide a basic understanding of how mobile technologies can and are used for learning.
– *Phase 2 Application* is shaped by the use of models to describe learning processes and by the construction of theories. Focus is on the learners' activities during the learning process, and on learning that is understood as «situated activity» and «participation in social practice» (Lave and Wenger 1991, 35). In this regard, hardware and software fade into the background; a collaborative, conversation and discourse oriented Engagement in learning and learning resources during the learning process gains more relevance. Accordingly, the leading theoretical and conceptual frameworks cover models that help in understanding collaboration, activity and conversation in the processes of learning. Also, these models are used as frameworks for planning and for the analysis of mobile learning. This is especially true for the Activity Theory (Engeström 2001; Engeström 2005) and the Conversational Framework (Laurillard 2002; Laurillard 2007). Sharples, Taylor, and Vavoula (2010) have,

based on these two models, developed initial attempts of a theory of mobile learning.

– *Phase 3 Development* of models is shaped by three development lines: the development line of proximity to everyday life draws a line from protectionism and banning of mobile phones to a critical media formation (Medienbildung) and school learning that also considers resources from the learners' everyday life; the development line of the ecology models considers components in the learning process that are involved in a mutual relationship; the development line of User and Learner Generated Contexts deals with learning places and learning contexts that are constructed by users or learners, and can be described as spaces for activity and creation. The tendency that becomes apparent within Phase 3 is to understand that learners are surrounded by their specific social, cultural and economic contexts, in which they are actively engaged in media use while creating, appropriating and constructing as part of formal learning. To get a hold of these complex dynamics in which learners are embedded and that they are constructing, some authors refer to the term «ecology» (Luckin et al. 2010; Pachler, et al. 2010; Sharples, et al. 2010). One current model that explicitly refers to mobile learning is the model of «Socio-Cultural Ecology of Mobile Learning» (Pachler, et al. 2010; see below also). This model covers areas that describe teaching as the provision of contents and teaching units, and also as discussion oriented and contexts and contents generating process of appropriation done by learners by referring to their agency, cultural practices and the structures by which learners are surrounded and which learners are constructing (see ibid. and below).

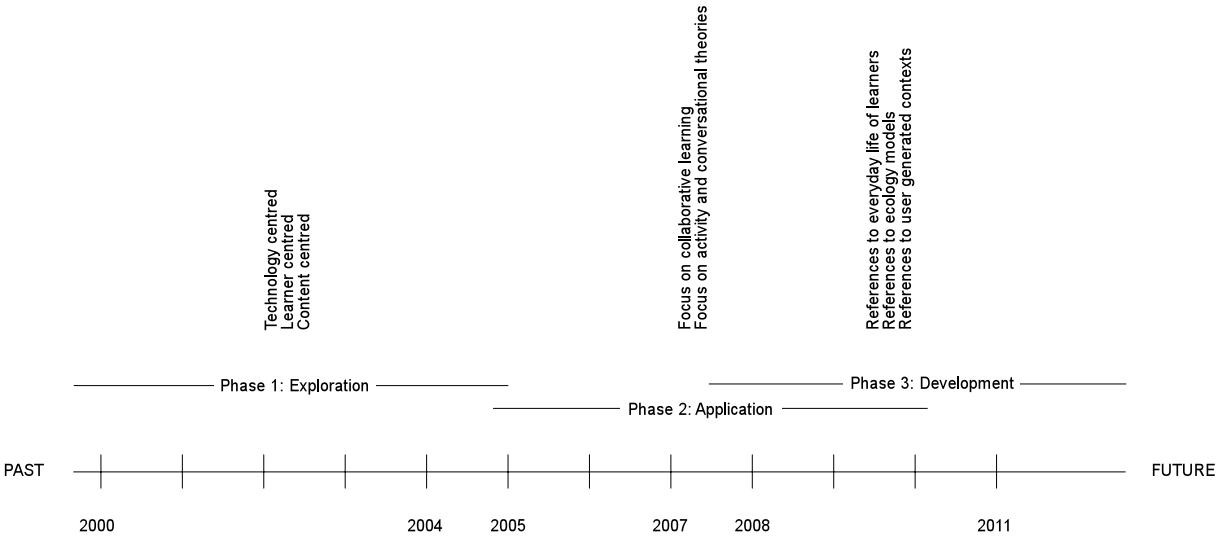

Figure 3: Structure of the scientific process with its phases and development lines (Seipold 2011b).

Prominent theories, concepts and models of the mobile learning discussion

Just a few theories, concepts and models that are used to explore, to analyse and to plan mobile learning are central in the current mobile learning discussion, for example, Engeström's Activity Theory (2001; 2005) and Laurillard's Conversational Framework (2002; 2007) as well as Sharples et al.'s (2010) Theory of Mobile Learning. Whilst Engeström and Laurillard put a focus on activity and conversation during the learning process, Sharples and colleagues want to make a model available that allows researchers and practitioners to access mobile learning as phenomenon and activity on several levels. In addition, there exist concepts such as Lave and Wenger's Communities of Practice (1991), their concept of situated learning and the «legitimate peripheral participation» (ibid., 31) as well as Vygotsky's ([1930] 1978) Zone of Proximal Development (ZPD) which are used to understand mobile learning. Even though these models are already successfully used for the description and analysis of single processes and phenomena of mobile learning *the* theory of mobile learning is still to be formulated.

The learner in the centre: theoretical an conceptual framework of a Socio-Cultural Ecology of Mobile Learning

The London Mobile Learning Group (LMLG) does not make a claim to develop such a theory of mobile learning, however, members of the LMLG do try to provide with their Socio-Cultural Ecology of Mobile Learning (Pachler et al. 2010) a framework for the analysis of mobile learning that does not only highlight one specific aspect of mobile learning practice, but that also includes socio-cultural and technological structures, agency of learners and their cultural practices as cornerstones. These cornerstones are embedded in the so-called «Mobile Complex» (ibid.), that is to be understood as social, cultural and technological changes and dynamics. By doing so, the learners' lifeworld is an argumentative starting point for the appropriation of cultural resources (e.g. media) via agency and cultural practices within given or self-created structures. Appropriation (or learning) is understood as a process of the producing and receiving engagement when using mobile technologies and is subjectively meaningful. In the course of this process learners engage in meaning-making. Both, appropriation and meaning-making, is defined as situated, contextualised and subjectively shaped. Accordingly learning – if understood as appropriation – can be described as a process of meaning-making within the arrangement of social and technological structures, cultural practices and agency (ibid, 156). For the mobile learning discussion the introduction of such a model means a systematic extension of the field. This extension has to do not only with the aspects mentioned above, but also with the learners' subjectively meaningful appropriation and meaning-making with the aim to position oneself (e.g. in relation to everyday life or school contexts). This, finally, offers prospects for education and formation (Bildung).

«Learner Generated Contexts» as resource, construction process and space of possibility

Against the background of the above, the concept of User Generated Contexts or Learner Generated Contexts gains importance. The concept is used to describe and understand the situational attitude of appropriation, which varies depending on place, time and availability of cultural resources, and it aims at the same time appropriation to be seen within dynamic, fluid and unstable structures (Cook 2010). Therefore, the context concept is a micro-view of the Mobile Complex (Cook, Pachler, and Bachmair 2011; Cook, Pachler, and Bradley 2008) as well as an attempt of systematisation and operationalization. By referring to the context concept, formal and informal (mobile) learning situations and processes become describable, comprehensible, reconstructible and thus plannable (Brown 2010) for learning contexts and lessons. Seen from the perspective of the mobile learning discussion the concept of learner-generated contexts has relevance because of the following reasons:

– The context concept moves the focus away from user-generated contents (UGC), which are produced within contexts (Luckin et al.,2010), and thus away from the idea learning tools or pre-set learning contents would be central for the learning process.
– Learning materials such as school books are not the only resources providing learning contents; also agency of learners, technologies, structures, networks, contents and so on gain importance, whether they are from the learners' everyday life or from school and learning contexts.
– On the way towards the development of a mobile learning theory it appears to be important to put a focus on contexts because, as new cultural products, (Bachmair 2010, 24) they are constructed by learners. In these self-produced contexts, the learners' agency, cultural practices, as well as their expertise, aesthetics, concepts of learning, aspects of identity, become apparent.
– The context concept provides links to current developments in mass communication as well as a contemporary understanding of learning as meaning-making in formalised and informal structures, because both move away from the idea of users/learners being consumers of pre-given contents towards an idea of users/learners as producers of self-chosen and self-created contents (The Learner Generated Contexts Group 2008).
– Because contexts can be situationally constructed anytime, anyplace, school and classroom lose their central position as only place for learning in the formalised learning process; other places or spaces – be it a swimming pool or a chat room – become relevant places for learning.
– Therefore, the context concept reveals the learners' everyday life to informal learning and allows researchers to construct links between informal and formal contexts and activities, and to frame them systematically.

– Within contexts, users/learners act in a flexible manner and are able to adjust resources (including structures, agency and cultural practices) to the demands and conditions of contexts.

Practice of mobile learning in school contexts

A short presentation of consequences will be given below that result from the relation between the implementation of mobile learning in schools, the demands from theory and the use of mobile technologies in everyday life. These consequences address aspects of teaching design, as well as areas that can be considered as being problematic, challenging, or successful. Also, it is possible to make statements related to different approaches of the implementation of mobile leaning in school, related to different degrees of opening of lessons towards the learners' everyday life, and related to dialectics that result from the contrast between the theory led mobile learning discussion and mobile learning practice. However, mobile learning has real innovation potential. It appears in a small scale only and often remains unnoticed, but it provides links to support personalised learning and to re-think traditional practices of meaning-making and learning (Pachler, Bachmair and Cook 2010; Seipold 2012b).

Three approaches to implement mobile learning in school-based learning practice

Three of the most common ways to implement mobile learning in formalised teaching and learning contexts are the «top-down approach» (technologies are made available via the institution and are set-up onto already existing structures), the «bottom-up approach» (teachers and learners rely on technologies and agency from everyday life) and the «demand-oriented approach» (formerly called the «affordance approach»; technologies and agency are situationally used) (see Figure 4 as well as Seipold 2012b; Seipold 2011a). Each of these different ways of implementation exemplify how to open school and lessons towards the learners' everyday life, their agency and their cultural practices (see Figure 5): The more learners are allowed to use their resources and cultural practices from everyday life, the more school opens itself towards the learners' everyday life and their preferred approaches to learning (whether they are teacher-centred or constructivist):

– *Top-down approach*: Often mobile devices are implemented into learning contexts from top to bottom, which means the devices are set-up in relation to already existing teaching and learning structures. This happens within big projects that have large budgets, for example. In such projects, whole grades, years or even schools are provided with mobile devices such as PDAs. On the one hand, this approach entails strong regulation; learners find themselves in pre-constructed structures and scopes of action. On the other hand, learners are provided with the necessary technology, infrastructure and resources that

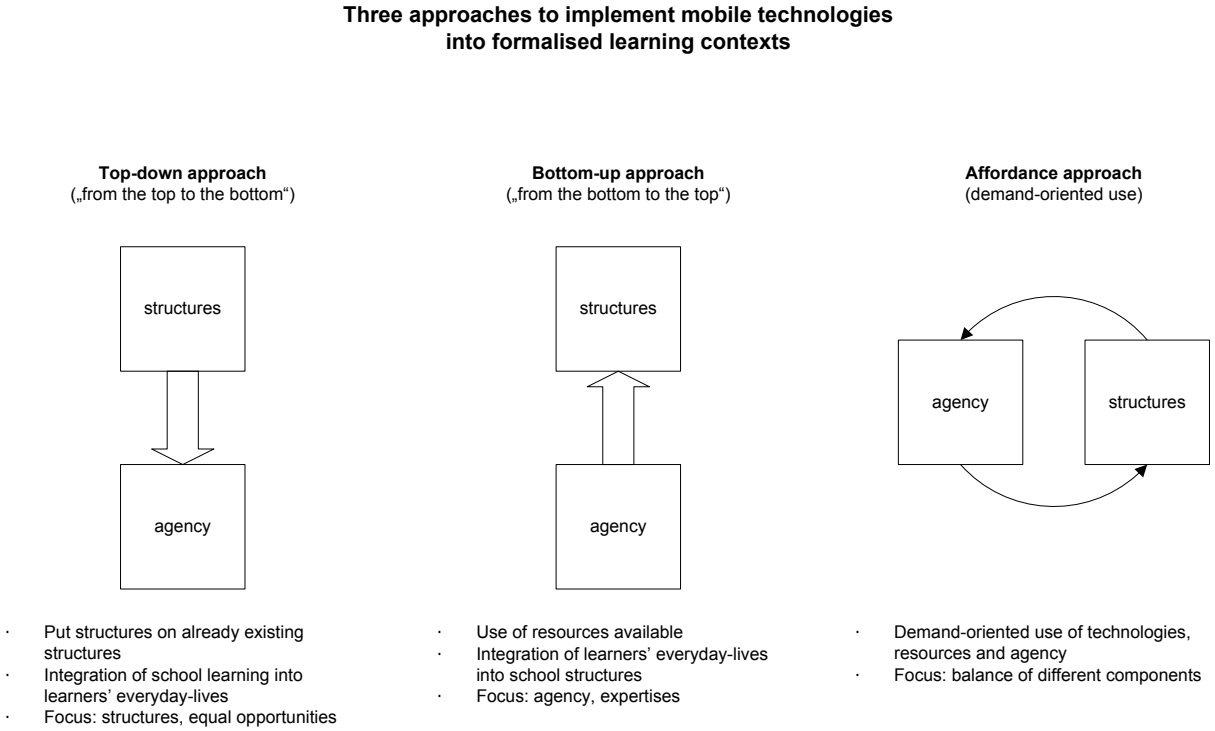

Figure 4: Three approaches to implement mobile technologies into formalised learning contexts (Seipold 2012a).

provide the basis for equal opportunities within the learning process, as well as for personalised and collaborative learning. These aspects may be relevant for learners who are disadvantaged on an infrastructural level, as well as for those characterized as weak learners. Both groups could find support through the top-down approach that is characterised by the provision of an infrastructure for learning.

– *Bottom-up approach*: The bottom-up approach takes available resources, such as devices and knowhow of learners and teachers into account. This saves cost because devices do not need to be supplied. In addition, learners are confident with their devices and can revert to their routines, competences and knowledge when using them. This approach targets all learners equally as it addresses topics, interests, competencies, expertise, and knowledge that are based in the learners' everyday life, and it opens school to all of these aspects. However, these resources have to be moderated by teachers and must be integrated into categories of school. With a view to technology, an approach like «Bring Your Own Device» (BYOD) possibly brings infrastructural challenges. However, these challenges could be seen as an opportunity for peer-teaching or collaborative learning, for example.

– *Demand-oriented approach*: The demand-orientated use of mobile technologies is the option that is closest to the everyday use of mobile technologies. This is because the devices, applications and practices are used only when users consider them necessary or helpful, or when teachers apply them selectively and explicitly as teaching and learning tools. Mobile use within this scenario is often related to the use of Interactive Whiteboards or platform solutions, such as Moodle or Mahara. Such arrangements are often very complex, and in order to guarantee the seamless use of these technologies in class, it is necessary to guarantee stable and sustainable infrastructures that are accessible to learners also from outside school (e.g. from home or on the go). Apart from this the demand-oriented strategy allows the school to be open to media use in everyday life, as appropriate, and allows the design of lessons by referring to instructional or communicative and discursive learning, alone or in groups. Also, it provides the opportunity to choose learning materials and contents provided by the school or to refer to resources from everyday life.

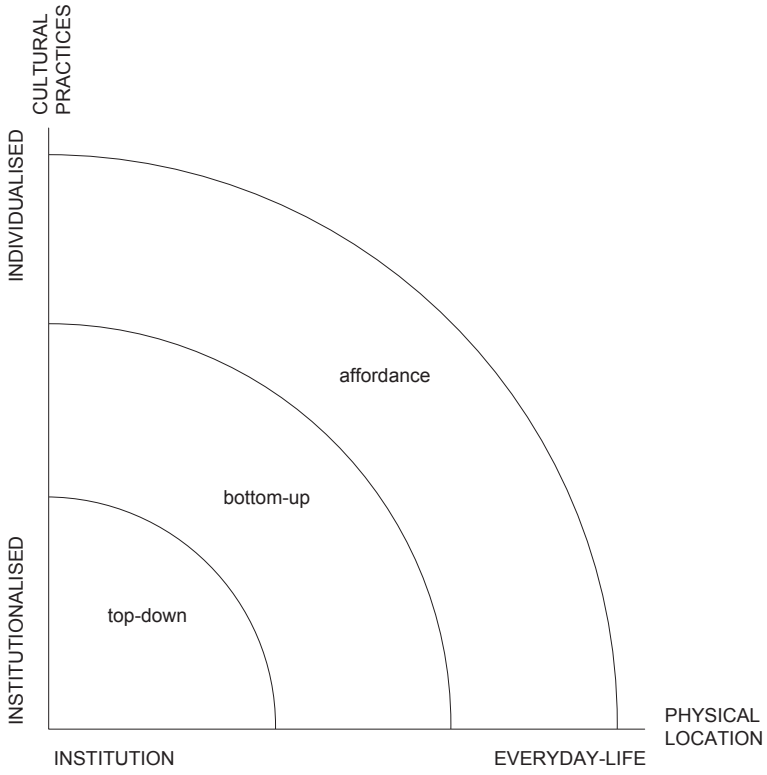

Figure 5: Opening of lessons with reference to three ways of implementing mobile learning in schools (German version in Seipold 2013).

Opening of school and lessons

One of the consequences deriving from these three approaches of the implementation of mobile learning relates to the opening of school and lessons. Within formalised contexts, this would mean that lessons range from strongly regulated learning and a focus on school as the place for learning to the individually shaped appropriation mechanisms that involve the opening of lessons towards the learners' everyday life (see Figure 5). Here it becomes obvious that the use of mobile technologies in school does not inevitably mean an opening of school or lessons. This, as well as the question of the implementation of mobile learning, and the contradictions in mobile learning practices (see below) must be considered when planning mobile learning.

Contradictions and breaches

Mobile learning in school practice can foster contradictions, and by doing so can cause difficulties rather than solution and «seamless transitions» (Arnedillo-Sánchez 2008, 77) between different contexts (see Figure 6).

Use of mobile technologies in everyday-life		**Use of mobile technologies in formalised learning contexts**
Subjective		Objective
Ephemeral streams		Sustainable use
Subjective meanings		Collaboratively agreed meanings
Momentariness		Sustainability
Multimodality		Monomodality
Informal		Formal
Ad hoc / affective / intuitive use		Supervised / controlled / refelcted use
Everyday-life		Institution
De-construction		Instruction

Figure 6: Contradictions in the use of mobile technologies in schools with focus on the duality of everyday life – school (German version in Seipold 2013).

Basically these challenges result from a «recontextualisation» of mobile devices and their functionalities when they are transferred from everyday life to lessons.

In this way, aspects that are related to subjectivity of learners during learning and appropriation are reduced. This might include the learners preferred media and modes, as well as subjectively shaped meanings, or the affective use of mobile technologies for communication and media production, and so on. However, use patterns and intentions from everyday life may be in opposition to the use and intentions of formalised school learning and other school contexts. For example, the practice of taking pictures and movies of an experiment in Austrian secondary school physics lessons (Schittelkopf 2007; Seipold 2012b) aimed to make these experiments sustainably available. The experiments had to be recorded and stored as objectively and comprehensibly as possible, because learners had to work together with these materials and at a later stage. By using photo or film, the use of the mobile phone remained very limited; it was not intended to use the devices for informal or formal discussions. Also, different modes were used successively, for example, photo and film were used for documenting the experiment, spoken word and written text aimed at adding basic information to the images. One of the results was that the spontaneous, intuitive and situational use of mobile devices was replaced by a strongly regulated use of the devices that guided learners to a reflective use of their mobile phones for documentary purposes. This result occurred as a by-product of instruction by the teacher without much space for learners to step into deconstructive learning processes.

The use of mobile technologies that is organized along school lines offers opportunities that allow equality of learners within the learning process, even if it would be desirable from the perspective of a socio-cultural ecology to integrate the everyday use of mobile technologies into the design of lessons and to carefully use the technology for school learning. For example, in relation to the use of learning platforms in connection with mobile learning, one must critically reflect if it is the use of the original functions and functionalities of mobile technologies that encourage spontaneous, situational and collaborative appropriation and meaning-making, or if the use of the devices for the recording of situations and the storing of contents on platforms stands in the centre of the learning process. Related to the latter, affective appropriation may become less important, and staggered spaces for reflection will be opened. In the regulated use of platforms and mobile technologies, all learners have the same pool of resources available that they can use to collaboratively negotiate on meanings, learn collaboratively, and build a common knowledge basis for their learning.

Teachers as moderators

Besides such aspects that are related to the compatibility of technologies or to the question of which resources of the learners' everyday life have relevance for lessons and school learning, one of the biggest challenges when opening lessons

towards the learners' everyday life, agency and cultural practices is the changing role of teachers. Also the contradictions that become apparent when using mobile media from everyday life in school lessons make it necessary for teachers to become moderators that must mediate between the demands of school and curriculum and the interests, competencies, expertise and knowledge of learners. Teachers must classify and organise subjectively shaped aspects, objectifying them and making them available to all learners. Teachers' goals are to provide learners orientation for their learning, as well as to show them frameworks that they can use to assess relevances and to adjust their personalised and individual learning processes to demands of school. At the same time, teachers must provide a basis of information to learners that is available and comprehensible to them and that can be used for comprehending meanings and for meaning-making (or in other words: for learning) by referring to collaborative, communicative and discursive practices.

Learners as revisers of structures of the learning process

Sometimes mobile learning invisibly results in a success. In such cases it is often the learners who realise during their learning processes what is claimed within the mobile learning discussion. For example, learners relate formal and informal contexts such as school and everyday life to each other and link them together (see «Handy» project in Pachler et al. 2010; Seipold 2012b; Seipold 2011a). By doing so they construct new learning contexts. Learners manage this by situationally designing learning and learning items with the aid of different media, modes and contents from their everyday life (e.g. photos that represent leisure time activities, expertise, social contacts, fun, consumption, etc.) and school (e.g. written text, problems and solutions, question and answer formats, etc.).

With a view to such learning outcomes as described in the «Handy» project, qualifications and competences related to the use of technologies become apparent. It is primarily the resources (i.e. media, modes, contents, production methods, agency, cultural practices and knowledge, etc.) that are indicators for which concept of learning or of the relevance of resources from everyday life, everyday practices and everyday situations for school learning learners have. These resources indicate the preferred teaching and learning patterns single learners have, what they consider as being appropriate for their meaning-making, what they are making available to others (e.g. to teachers who have to evaluate and assess the learning outcomes according to categories determined by school) and more generally,: how learning and school can change so that learners (with their competencies, interests, expertise, knowledge, agency and cultural practices) are taken seriously. This can be understood as a chance to revise traditional structures and to establish new ones in which learners can construct and design their own

convergent learning spaces, contexts and revision frameworks – with and without mobile media.

Closing remarks

Mobile learning is learning with mobile technologies at first glance only. After a closer look, it becomes obvious that the mobile learning discussion is more about new or contemporary learning. Also, mobile learning covers questions that relate to other contexts such as research about teaching and learning, or teaching design, and so on. Mobile learning is even related to political dimensions when new forms of teaching, learning and schooling are discussed.

Even if there exists attempts to systematize the theoretical discussion, as well as the mobile learning practice, discrepancies and uncertainties remain. Thus, simple solutions in relation to mobile learning do not yet exist/. Assumptions of what mobile learning is and the goals of mobile learning are fluid; political claims intermix with statements about teaching and learning practice; the use of mobile technologies in school lessons do not necessarily result in innovative learning. Simply establishing mobile technologies into already existing structures of curricular learning and school lessons, as well as the mindless integration of resources and agency of learners from their everyday life, does not enhance learning. Subjectively shaped activity fade into the background in favour of objectivation and equal distribution of contents, information, infrastructure, etc. Astonishingly, in some cases, it is the learners with their agency, cultural practices and expertise in using mobile technologies who succeed in finding and establishing links between subjectively shaped appropriation and meanings on the one side and objectively framed requirements of school and curriculum on the other. By doing so, they help mobile learning obtain the innovative potential that it so often claims.

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A Cultural Ecological Frame for Mobility and Learning

Ben Bachmair and Norbert Pachler

Abstract

Mobile devices and services have achieved a level of critical mass and importance that requires us to take them seriously as new cultural resources. Mobile cultural resources emerge within what we call a ‹mobile complex›, which consists of the interplay of structures, agency and cultural practices. These new cultural resources also can be considered to be valid learning resources which are ‹complex› because the components of the triangular structuration model, that governs them, interact with each other in intricate ways. They are in a state of perpetual flux, where boundary blurring takes place and where society and culture are experiencing the delimitation of mass communication. This paper is organized in four major parts:

The first part looks at trends of modernization, the mobile ‹delimitation› of mass communication and learning. We consider mobility and learning to be key factors in this process of boundary blurring. A worrying global problem is highlighted, namely that schools are in danger of losing up to 20 to 25% of students who find it difficult to reach the defined curricular targets. This apparent ‹exclusion› affects learners who set their own learning trajectories through informal learning mediated by mobile devices. We go on to argue that media, and user-generated contexts and content linked to them, are cultural resources.

The second part of the paper offers a preliminary discussion of the idea of learning and knowledge as resources in the transformation processes of learning inside and outside of educational institutions. Specifically, we examine epistemological challenges and propose a media ecological response to the delimitation of television and the mobile constellation of mass communication. This section looks briefly at existing conceptual frames, applying the concept of ‹affordance› originating from Gibson (1979). This leads us into a consideration of learning as appropriation or Bildung (formation).

In the third part of the paper we examine how the products of these transformation processes acquire the function of learning resources. Our discussion shows how the on-going process of individualization and fragmentation is enforced by the media of everyday life, which function as cultural objects, as symbolic material integral to users' personal life-worlds. Specifically, we make an analytical proposal about learning linked to a discussion of affordance and individualized, mobile, convergent mass communication.

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Finally, in the fourth part of the paper, we examine educational practices of young people (potentially) ‹at risk› within a cultural ecological frame in relation to the notion of user-generated contexts.
We conclude by pointing to recent work in the field, in particular Rymes' (2011) deference approach, which we consider to be relevant for the planning and evaluation of future mobile learning interventions.

Trends of modernization, mobile ‹delimitation› of mass communication and learning

21st century Europe, like much of the rest of the world, is characterised by an increasing normalization of mobile devices and technologies – from mobile phones to tablets – in all spheres of life and for a wide range of purposes including communication, social networking, leisure and entertainment, personal organisation, shopping as well as learning in informal contexts. We take the view that mobile devices have achieved a level of critical mass and importance that requires us to take them seriously as new cultural resources and, by implication, as learning resources. Mobile cultural resources emerge within what we call a ‹mobile complex›, which consists of specific structures, agency and cultural practices (see Pachler, Bachmair and Cook 2010). These specific structures, agency and cultural practices of the mobile complex are in perpetual flux. From the conceptual perspective of ‹second modernity› and ‹reflexive modernity› (Beck and Grande 2010; Beck and Lau 2004; Beck, Bonss and Lau 2003; Lash, Giddens and Beck 1994), *perpetual flux* can be described with the term *Entgrenzung* (delimitation, boundary blurring), i. e. the removal of systemic demarcations. This boundary blurring or, in terms of Giddens' structuration theory, ‹delimitation› is part of a new constellation of mass communication as well as of learning.

Changing constellations of mass communication

We consider mobility and learning to be key factors in this process of boundary blurring of mass communication, which became particularly visible with mobile phones and mp3 players, in particular Apple's *iPod*. At its inception, the mobile phone was simply a telephone that was independent from a landline. The *iPod*, starting in 2001, introduced completely new mobile features; it connected the mp3-player with the Internet for music download through the software package *iTunes*. This opened up the music industry to the principle of individualized consumption on the go. It led to a normalization of individual decisions about music consumption through legal download at any time and from anywhere. Today, mobile phones tend to feature an mp3 player as standard and enlarge users' Internet options around streaming music. Well-known services at the time of writing are *Spotify* and *Last.fm*. Also, social network(ing) sites such as *YouTube* provided the option of

uploading and viewing self-made digital videos. Alongside these developments, the diversification of mobile devices, from smartphones to tablets, made available a range of modes of representation from still images and writing, to videos and the spoken word.

As a consequence of these developments, multimodal mass communication has become the norm, but it is located within the domain of the individualized use of the Internet. The individualization of Internet use through mobile access via smartphone and tablets challenges the dominance of the Internet as a context defined by external providers. User-generated content not only dominates Internet television (cf. *YouTube*) but also users create specific patterns and contexts of mobile use in relation to their own (perceived) needs. Individuals construct their own specific media contexts on the go, within – and in response to – the specific contexts of their everyday lives as well as in relation to the Internet.

This ubiquitous, individualized use of mobile devices within a convergent media system has started to determine mass communication. Of course, there are obstacles such as expensive flat rates or a lack of connectivity. But ubiquity as a category that combines individuality, convergence and mobility, has started to define a new constellation of mass communication. The practical dimension of ubiquity means that a user of a smartphone or of a tablet has at his or her disposal downloads and uploads at any time and from anywhere. This leads to a fragmentation of contexts, but these fragmented contexts are generated within the dominant sites of users' activity patterns and self-selected Internet sites.

Changing constellations of learning

The phenomena of a new constellation of mass communication with individualized mobility and user-generated contexts (Bachmair and Pachler, forthcoming) indicate an enormous paradigm shift. Parallel to this on-going boundary blurring in mass communication, learning is in a process of transition. The growing importance of learning in informal contexts and across the life course is symptomatic. Schools, and their approaches to teaching and learning, depending on one's vantage point, are stable or resistant to change. However, dominant global economic changes require schools to rethink their approaches. PISA, the Programme for International Student Assessment, and governments around the world striving for global knowledge societies and creative economies are drivers for education systems to ‹modernize› by adopting the rationale of output-orientated knowledge production. Assessment systems such as PISA are, therefore, part of the transformation of schools for the purpose of strategic knowledge production. Standardized assessment is used as a driver to deliver objectified judgements concerning learning outcomes and to serve as a measure of success in aligning teaching and learning processes to predefined curricular targets. Along with other

drivers in this modernization process, mobile devices have been, and continue to be, excluded from the cultural practices of the school. However, tablets, which operate within the logic of computers, are increasingly viewed as promising to ‹deliver› output-orientated learning and a growing number of schools have started to purchase them (see e. g. http://larrycuban.wordpress.com/2013/06/21/ipads-in-los-angeles-and-tco/). This means mobile devices are becoming institutionalised resources for fulfilling strategic learning standards and goals.

Lauder et al. (2006, 719 – 849) describe this neoliberal transformation as assessment-approach and view it as a reaction to, and as part of the on-going societal transformation of globalization, which transfers basic principles of a controlled and output-orientated production to education and learning. In line with this output-orientated knowledge production paradigm, personal competences are defined as learning outcomes. Also, media education has followed this trend of knowledge ‹technology› by targeting media literacy (Medienkompetenz), which transfers the capability of media use in an increasingly open media market to the individual user as part of their personal potential for agency.

With the trend towards output-orientated knowledge production in many countries, schools are in danger of losing up to 20 to 25 % of young people who find it difficult to reach the defined curricular targets. They tend to belong to socio-cultural milieus, which are at a distance to school and formal education. Of course, there are different reasons, linked to migration, low family income and the gender gap. These young people are at a distance to formal education and are disconnected from formal learning in school. After completing compulsory education they tend to face difficulties when trying to access training, further education or employment. But for this group, often referred to as NEETs (McCrone et al. 2013), the concept of competencies as individually generated and individually accounted for capability loses its validity, because they act outside of the education system. In this way, the school as an institution is increasingly losing its legitimatised power over learning for all citizens. A ‹modernization› programme for schools driven by the assessment of attainment and competencies, therefore, appears to come at a price, namely that of seemingly excluding a significant number of young people from institutionalised learning. This exclusion affects learners who set their own learning trajectories through informal learning mediated by mobile devices and services through their life-course. At this point ‹modernization› re-enforces the boundaries of schools and of traditional definitions of learning and leads to the exclusion of specific learning resources, including that of mobile devices, as they are viewed as existing within an entertainment paradigm. The exclusion does not happen only through the social exclusion of learners, it also excludes learner-defined and learner-generated resources.

Resources for the knowledge society

A second dynamic of modernization is that it tries to overcome the learning routines of schools. It results from the motivation of addressing the deficits of teacher-guided instruction with its framing of learning as memorization and repetition of isolated chunks of knowledge. One modernization target is to ensure the fitness-for-purpose of the school for the knowledge society with a so-called «war for talents» (Brown and Lauder 2006, 130) which can be viewed as a kind of «digital Taylorism» (Brown and Lauder 2006, 127). ‹Digital Taylorism› seeks to achieve efficiency gains inter alia through standardizing assessment in order to be able to better rank learning outcomes. However, it also seeks to integrate educational concepts which pursue seemingly antithetical forms of learning such as learner autonomy characteristic of situated learning (Lave and Wenger 1991). Modernization in the sense of ‹digital Taylorism› correlates with neoliberal ideas, which, for example, transfer risks to individuals, and makes them responsible for success or failure. An anthropologically and historically aware perspective on teaching and learning, one that identifies the *humanistic* values of schooling and education, is in opposition to ‹digital Taylorism›.

Another perspective, which we find appealing, is social semiotics (see Kress 2010), which understands learning as an important form of meaning making in a multimodal world characterised by provisionality. In this line of argumentation, the issue of learning resources comes to the fore and with it the question of the role of mobile mass communication and associated mobile devices as optional resources for learning.

The issue of mobile devices as learning resources is not necessarily linked to a neoliberal modernization programme such as *digital Taylorism*. In a critical vein, Lehner (2010, 272) emphasizes «knowledge as a central economic resource» for society. Knowledge as a resource has become an «independent factor of production», which is entangled with inequality. Furthermore, the rapid development of knowledge and its segregation produces insecurity, which makes knowledge a risk factor (Lehner 2010, 273). These conceptualisations are reflected in the international educational discourse about learning, in particular in «situated learning» (Lave and Wenger 1991) and «collaborative knowledge building» (Scardamalia and Bereiter 1999). From these perspectives, media as well as user-generated contexts and content are cultural resources. And, the issue of resources has to be considered educationally in the tradition of the critical discussion of energy and nature as not simply available for exploitation. Media, as well as new user-generated contexts and content as cultural resources, have to be viewed from a perspective of a cultural ecology.

In a wider consideration we interpret this development with reference to Bourdieu as «social capital» (e. g. Bourdieu 1986), which provides the scope for dealing with social differences in learning success or failure. Within his notion of cultural capital, Bourdieu constructs three sub-categories: ‹objectified› capital, such as artworks, which can be literally bought and sold; ‹embodied› capital, in the form of habits and dispositions of a person, such as knowing how to behave at the opera or how to view a painting at an exhibition; and ‹institutionalised› capital, in the form of academic qualifications and recognised professional credentials (Legg 2012, 159). In relation to individualized, convergent, mobile mass communication the objectified cultural capital can be the expensive *iPhone* or the clicks on a video on *YouTube*; the embodied cultural capital, e. g. how to use *Facebook* with peers or find videos for a school subject on *YouTube*. Institutionalised cultural capital can be the recognition of informal learning within media contexts by the school or within vocational training.

Epistemological challenges – a media ecological response to the delimitation of television and the mobile constellation of mass communication

At this point in our discussion of the transformation of mass communication and learning with reference to the concept of resources, we reach the crucial point of an ecological interpretation of societal developments. Knowledge and learning are resources, along with the actual mobile devices that have become integral to everyday life in the context of the individualization of mass communication. By proposing an ecological view of mobile devices, and the artefacts accessed through and produced with them, we align our discussion with the comparable processes of transformation in thinking about energy and nature from the 1970s onwards. From an ecological perspective, and with reference to the exploitation of nature, two political issues arose, namely inequality and power in the provision of food and the use of energy. In the field of culture, attempting an ecological interpretation of the changing nature of mass communication and learning in the context of the rise of individualized, mobile, convergent mass communication and its devices and services, the focus turns to cultural resources within human development in relation to school and media education. At one level, cultural resources are individualized mobile devices within media convergence such as smartphones, mp3 players, game consoles or tablets in the context of social media such as *YouTube* and *Facebook*. Also, knowledge in all its specifications of products and process, such as informal learning, competencies, literacy etc., is covered by the concept of cultural resource.

Because our argument is located in the field of learning with media, technology-enhanced learning, and media education, we want to look briefly at existing conceptual frames, among them the media ecology of Postman (1983, 1993)

in the U.S. and that of Baacke (1989) in Germany. Both offer restricted system approaches, which do not respond to the on-going processes of boundary-crossing modernization. Alternatively, we try to apply the concept of «affordance» that originates from Gibson (1979). This concept derives from an anthropological view of perception as a contextualized activity and can be widened culturally by a discussion of contexts provided by mass communication and education. Such a view opens the scope of our argument to the interrelationship of new mobile, individualized, convergent constellations of mass communication and learning. As basic frame for learning we refer to appropriation as *Bildung* (formation), the German concept of the late Enlightenment of the 1790s (Humboldt 2002), which combined Rousseau's anthropologic concept of learning as personal development with the cultural frame of learning as development resulting from internalizing cultural products. The dynamic for human development of *Bildung* comes from formative expression triggered by the appropriation of cultural products. The curricular model is based on the selection and delivery of relevant cultural objects for appropriation by learners. This idea was actualized among others in the field of Cultural Studies in relation to media use as a cultural activity (see Pachler, Cook and Bachmair 2010).

Postman's system approach and mono-dimensional proposal for practice

Explicit approaches to media ecology such as those by Postman (1982) or Baacke (1989) emerged as a response to the changes brought about by television which had amalgamated with everyday life. Both endeavours work with a systems approach to describe the interrelationship of everyday life and television as the dominant mass medium. Postman discusses the systems of childhood and television as cultural constructs. The cultural invention of the medium television changes the public sphere, which has a deep impact on childhood. In particular, television makes public aspects of the *secret* adult world, which had tended to be unavailable and not accessible to children since the invention of movable type printing as they lacked the requisite literacy skills. But Postman considers certain ‹secrets› to be essential for childhood. Postman's simplistic claim is to switch off television in order to protect childhood. In *Amusing ourselves to death* Postman advances the view that inherent in a particular medium is a specific way of dealing with information and he discusses the differences between oral, literate and televisual cultures, arguing that the latter fosters a passive mentality by dissolving the traditional relationship between information and action. Postman's practical proposal is to conserve the pre-television media. This proposal for media educational practice is more or less the moral romanticisation of the traditional, without a discussion of gains and losses, or of accounting for dominance and exclusion. Calls for ‹switching off› the modernization processes are not at all unusual for the ecology of the 1970s

and 1980s, as is evident for example in the refusal of products of an industrialized agriculture by some people who instead preferred to knit home-produced wool. Postman's answer to the blurring of boundaries in the public sphere was, and is, inadequate as a response to the complexity of cultural development processes, such as the boundary blurring of mass communication. It remains within the mono-dimensional rationale of the industrialization of communication, which Horkheimer and Adorno (1969) criticized through their dialectic analysis of the culture industry of the 1940s.

Baacke's system approach to media in the life world and human development

In the Federal Republic of Germany, Baacke promoted media education for television as part of viewers' life worlds, which led to a social ecology that avoided the conservative certainties and the moralizing tones inherent in Postman's approach. The basic idea revolved around the life world as the system in which people and media are related to each other. Baacke had already raised the question of the relationship between communication and action in the context of mass communication in 1973, when he discussed communication and competences as a frame for media education.

In this system approach, mass communication of public media (newspaper, radio and television) provides a general frame for communication in society (Baacke 1973, 180-1). Baacke contributed to the view in media education of people as active media users who develop competencies through participation in mass communication. His question about the person as actor focused on linguistic and communicative competence (p. 257) of the people in the system of mass communication and also on the use of language in their life worlds. In this discussion of language and life (1973, 257) the concept of ecology appears.

In 1989, with his later research on media socialization, Baacke's system view on media in the life worlds of children and adolescents took a practical turn when he investigated the media world of young people in different spheres. He was particularly interested in the developmental processes of young people, how they gradually disengaged from their families by seeking friendships with peers, in pairs or cliques outside of home. Baacke accompanied young people on their journeys through the world of media that was «located in dreams, desires, thoughts and fantasies». These inner and outer media spaces are part of the social ecology young people inhabit (ibid., 95).

In his later work, Baacke (1999) linked the development of children and young people to the concept of inner and outer media spaces and the concept of zones of development. He distinguished four zones, ranging from the ecologic centre of the family at home, to ecological spaces such as neighbourhoods, to places such as kindergartens and schools, and the ecological periphery such as tourist resorts.

These socio-ecological zones combine the internal and external media worlds of children and young people to a structured system. Media ecology investigates this system of the inner and outer media world. For an overview of the media ecology of Dieter Baacke see: Ganguin 2008; Ganguin and Sander 2005.

Postman's and Baacke's media-related systems are directed, albeit to different degrees, towards the development of children and adolescents. They describe and evaluate differently the relationship of children and adolescents to media as part of world systems. This relationship remains conceptually rather vague. Postman laments the intrusion of media and their structures in a childhood that is in decline. Similarly, Baacke, in his media-ecological investigation in 1989, features the culturally critical statement: «young people in the maelstrom of the media». In his practical work, however, Baacke (1989, 11) proposes to teachers not to demonize the modern media but to «accept them as given and unchangeable». But, he posits, «we should live not only in media worlds» (1989, 11).

One could ask how Baacke's system approach is able to evaluate media worlds and human development by refusing media as a cultural invasion on the one hand, and on the other to accept them but only under certain conditions. This ambivalence prevents it from addressing independence as a salient structure of the cultural ecological system. At this point the concept of affordance is helpful, which stems from perceptual psychology. We use the concept of affordance to view media as part of a contextual system with the perceiving subject at its centre.

The concept of affordance and a context-related media ecology

Gibson (1979) offered a kind of anthropologic anchor to an ecologic argumentation by focusing on perception. Perception takes place in the interdependent relation of perceiver, object of perception and environment. Gibson's focus on perception introduces a relational understanding through the category of affordance. This relational understanding augments the educational focus of Baacke's system approach of the inner and outer world with the concept of affordance aiming to address the contextual relationship of the perceiver and object.

Originally Gibson (1979, 63) introduced the concept of perception in opposition to the stimulus-response scheme:

> The ambient stimulus information available in the sea of energy around us ... is not transmitted, does not consist of signals, and does not entail a sender and receiver. The environment does not communicate with the observers who inhabit it. Why should the world speak to us?

The theoretical model of stimulus and response is not of interest here. But Gibson's attempt to deal with the contexts of perception as the centre of an ecological system-theoretical analysis is very interesting:

> The affordances of the environment ... are in a sense objective, real and physical. ... An affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet, neither. An affordance points both ways, to the environment and to the observer. (1979, 129)

The British learning technologist Oliver (2005) applies Gibson's ecology of perception to media and design phenomena. With reference to current media technology and media design, he characterises affordance as «mapping», «cultural constraints» and «conventions» (ibid., 406). He expands this line of argument and considers all cultural artefacts as cultural text (ibid., 411). It is necessary to set up a critical discourse to identify and evaluate the affordance of cultural texts. This argumentation opens the anthropological relational model of perception to culture. Oliver interprets the perceived objects as cultural artefacts, which work as culturally designed texts (ibid., 411). The interrelation of perceiver, object and environment does not just include designed text. Furthermore, the environment is a culturally designed text that works as context by featuring structures and agency of perceptions. In this line of argumentation, context becomes a defining feature of a cultural ecology.

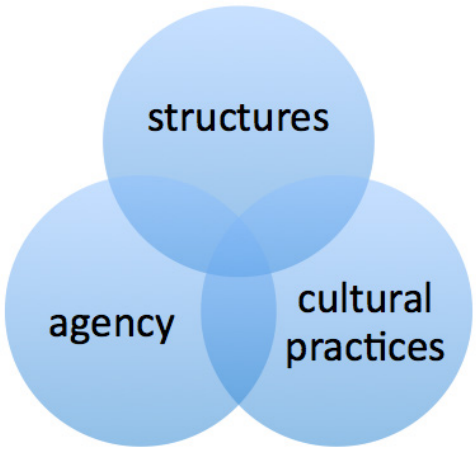
From the perspective of a cultural ecology with a focus on perception, the question arises how elements of the perception system, namely the perceiving subjects and the perceivable environment, relate to each other. At a theoretical level, Gibson posited a relationship of reciprocity between perception and the perceptible through the concept of affordance. Affordance is a correspondence of subject, perception and objects in and across contexts. Gibson and Pick (2000, 14 ff.) explained the rather artificial term ‹affordance› with the example of a chair that is designed to be sat on. This example is naïve, because, as we know, children use chairs to play with and not only for sitting on them. That means that the affordance, the relationship of the chair and the child, is culturally constructed by the respective social and cultural environment and not per se given. For the perception of media as cultural products it is clear that media reception is part of a complex process of selection and processing, which corresponds to what is semiotically objectified in a media text. Applied to the Internet, it is about the relationship between text and contexts with the acting subjects, who are involved in diverse contexts such as school or peers. Involvement means that the acting subjects generate new contexts, for example, by combining different contexts on the Internet with different social groups and activities of everyday life. In mass communication, now characterised by boundary crossing, the mobile phone provides access to contexts by virtue of text production and text reception. Different mobile devices offer or challenge different affordances within and beyond contexts.

Affordance and the individualized, mobile, convergent constellation of mass communication and learning: an analytical proposal

We began our outline of an ecological approach with trends of boundary blurring in mass communication with particular reference to mobility, individualization and convergence. We then offered a preliminary discussion of the idea of learning and knowledge as resources in the transformation processes of learning inside and outside of educational institutions. In this section we ask the question how the products of these transformation processes acquire the function of learning resources. The answer, among other things, relates to the notion of mobile devices as cultural resources: the on-going process of individualization and fragmentation is enforced by the media of everyday life, which function as cultural objects, as symbolic material integral to users' personal life-worlds.

The interrelationship of structures, agency and cultural practices

We view the role of affordance as a productive interrelationship of elements of the social capital of learners in the contexts within which they are generated and as entangled interpretations of, and activities undertaken by means of mobile offerings, specifically smartphones. Affordance is realized in the processes of meaning making. In our definition we view meaning making as generative. The processes relating to affordance can be analyzed by means of a triangular model, which draws on Giddens' structuration model (1984; Pachler, Bachmair and Cook 2010, 25 ff.). We are interested in the structures, the agency and the cultural practices of the mobile, individualized, convergent constellations of mass communication and the attendant transformations of learning. We summarize this development as ‹mobile complex› and as ‹learning complex›. Our triangular structuration model organizes analysis around the following three nodes:



- technological and socio-cultural structures of the mobile complex and the learning complex;
- agency of users; and
- cultural practices of media use and learning.

It targets the cultural capital within which users appropriate cultural resources for their personal development within the wider frame of the mobile complex (see also Pachler, Cook and Bachmair, 2010).

In the foreground of the technological and socio-cultural structures outlined briefly above are changes to mass communication, in particular mobility, individualization and convergence. One outcome is that just a part of mass communication still operates in a linear way. That means, only some media are still produced professionally for mainly passive mass audiences. With social media, which Internet users increasingly access via their smartphones, media content is produced within individualized contextual frames (user-generated content and contexts) by users. Generating content and contexts has become a routine practice worldwide.

Despite this normalization, the generation of contexts continues to be conceptually and educationally little understood (see also Pachler, Cook and Bachmair 2010). Referring partly to Dourish (2004), we view context as a frame under construction for optional combinations of actions, representational resources inclusive of media and literacy, virtual and local sites or social sites such as socio-cultural milieus. These cultural practices in mass communication are largely in juxtaposition to institutional teaching practices where instruction follows more or less a teacher-guided transfer model. The affordance of mobile devices as interrelated options for education can succeed when the traditional, linear model of teaching is extended, at least temporarily, with episodes of situated learning. (see e. g. Bachmair et al. 2011)

A significant feature of a change in agency is the neoliberal transformation of the learner into an entrepreneurial self («unternehmerisches Selbst»; Bröckling 2007) responsible for his/her own resources and the development of these resources in order to acquire the relevant knowledge, skills and understanding and to develop the necessary personal capacity for learning to achieve self-optimisation. Autonomy and responsibility for personal success are general principles of subjectivity in a socially divided society (see Butterwegge et al. 2008, 167 ff.). This correlates with the habitus of target-orientated activities and learning. But in mass communication other forms of habitus are dominant such as self-representation and play. With a mobile in one's hand linked to social network(ing) sites, self-representation and play are standard practices. Institutionalised learning, however, is still dominated by target orientation. On the other hand, agency in the context of social media usually operates at a low level of reflexivity; chattiness and banality are in the foreground of mass communication. However, the school could assimilate banal chatter because of its links with learning informally in everyday life. Of course, part of the assimilation strategy is to graft reflexive and traditional forms of communication onto the use of mobile devices. Our work with at-risk learners suggests that mobile portfolios offer similar new forms of reflexivity (see e. g. Bachmair and Pachler 2013).

The cultural practices of learning and media use can be related to each other, if they support target-orientated knowledge transfer and knowledge accumulation. But there is a divide between mass communication and learning in informal contexts outside the school, and teacher-guided and assessed instruction inside school. As already mentioned, the linear model of school education is under pressure from the on-going process of cultural transformation. At the time of writing this pressure can be seen to lead to educational policy initiatives seeking the optimization of knowledge output. In this logic, there is a correlation with tablets conceived as mini-computers. However, there is also an alternative view, which we see ourselves contributing to, promoting new modes of learning within technology-mediated learning environments characterised among other things by user-generated contexts.

Tools to make ecological complexity operational

We propose tools for the analysis of mobile learning, which we call parameters, and focal points for planning.

Didactic parameters for analysing and planning

The following four didactic parameters create a didactic space for teaching and learning (see Pachler, Bachmair and Cook 2010, 209ff.). They provide a map of possible approaches to assimilating cultural resources into school. The agents of this assimilation are mainly teachers and their emphases and preferences along the four didactic parameters. The four parameters span the poles ‹static› and ‹flexible›. They link opposing learning and media practices and address differences in learning habitus. If one applies these four parameters within the global space of learners' life-worlds, the scope and variability for analysing and planning learning situations and context becomes considerable.

Parameter A: Learning sets

Pole: Practice of the school --- Pole: Practices of mobile devices

The concept of a learning set comprises all possible arrangements of constituent variables of learning such as teacher, learner, environment, media/tools, curriculum etc. This includes, for example, teacher-centred input in a lesson, homework tasks completed with a laptop or an Internet community for Maths, etc. The dimension of a learning set across the poles of school practices and mobile device practices captures the possibilities for students from school-based work to learning informally in everyday life contexts as well as in-between. Everyday life includes the use of mobile media for personal use and, of course, for meaning making in different contexts, for intentional and planned or serendipitous and accidental learning.

Parameter B: Relationship to the object of learning

Pole: Mimetic reproduction --- Pole: Personal reconstruction

One desirable characteristic of successful instruction is to facilitate a type of learning, which does not focus only on the passive repetition and memorization of learning objects. Collaborative knowledge building is one widely accepted and practically used alternative. Examples of mobile homework on *YouTube* offer specific and workable suggestions about how to work with these mobile, convergent practices in the school (see e. g. Pachler, Bachmair and Cook 2010, 293-6). Collaborative knowledge building can combine mimetic practices of learning with media use for personal reconstruction. One important task of schools is to move ‹native›, reconstructive learning onto a higher level of reflexivity.

Parameter C: Institutional emphasis on expertise

Pole: School curriculum --- Pole: Personal expertise

There are a number of teaching and learning models (‹scripts›; see Kollar and Fischer 2008), which contain a variety of options for relating the personal expertise of students to a given school curriculum, thereby opening up socio-culturally relevant directions for teachers such as collaborative knowledge building, teacher-guided instruction or situated learning.

Parameter D: Modes of representation

Pole: Discrete (mono media, mono modal) --- Pole: Convergent

Mobile media, in particular the mobile phone, have become part of everyday life because they have affordances in relation to multimodal representation and enable near-ubiquitous access to convergent media for which the Internet is the global network. Mobile media offer the following applications for learning:

- interaction with peers by telephone, messaging, email;
- picture and video recording;
- storage of photos, data files, games, software etc.;
- access to the media world, Internet, archives (media convergence);
- individual disposal of time and space through the formation of contexts and situations;
- multimodal representation.

Focal points for planning mobile learning

The focal points represent the educational and didactic options within the four parameters in the form of guidelines and combine them with the breadth of available mobile applications.

a. To integrate informal learning in formal learning contexts

Mobile devices as part of everyday life offer the possibility to integrate learning in informal contexts and knowledge of everyday life in the school. They function as an interface between the culture of children and young people, their everyday life and learning in the classroom.

b. Setting up episodes of situated learning

Mobile devices support forms of situated learning. One basic form is to integrate episodes of situated learning into teacher-guided instruction. Metaphorically speaking, teacher-guided instruction functions like a learning path, which opens to squares of situated learning by means of mobile devices.

c. Generating learning and media contexts

Mobile devices contain the option for learners to generate their own contexts of learning. These learning contexts arise as interfaces of media convergence with the Internet, entertainment offers of media, the learners' life worlds and the school.

d. Mobile devices serve as conversational threads

In the convergent world of media and the Internet, mobile devices function as bridges between user-generated contexts and school. They are part of conversational threads between everyday life and convergent media.

e. Supporting students as naïve experts, e. g. of media use in everyday life within the school

In the process of individualization and fragmentation of our society students, like anyone else, are naïve experts in everyday life. Ubiquitous mobile devices function as tools of everyday life with play having an important role.

f. Setting up responsive contexts for personal development and learning

We view learning as an integral part of personal development, which takes place in supportive contexts responsive to learners' actual and key development needs. Contexts generated by children and young people in the mobile, individualized, convergent media world are usually closely related to the issues and topics of their personal development. Learning succeeds if these developmental topics are part of learning. One may not expect that this is accomplished without detours.

Educational practices around user-generated contexts with at-risk learners within a cultural ecological frame

The notion of affordance suggests an orientation towards contexts, which support learning as an integral part of learners' personal development as proposed by the sixth focal point above. The following scenario was designed as a pre-sessional learning opportunity for learners about to embark on a media course after compulsory schooling. The intention was to give participants the opportunity to gain a new and positive understanding of learning in the context of formal education. The key success criterion for such an understanding was considered to be the ability to view learning in a formal educational setting as resonating with experiences of learning in the informal contexts of participants' everyday life worlds. The mechanism by which to achieve this was the mobile phone, which we consider to be a cultural resource normalized in the everyday life of young people. By means of the mobile phone, participants were encouraged to bring elements of their learning in informal contexts into formal educational contexts.

The workshop was the scoping for an induction to a media design course for newcomers to the college and ran over two days. It started with an open, associative investigation of the college as learning environment. Participants were invited to use their own mobile phone or smartphone for taking photos about their exploration of the college. The intention behind using the personal mobile phone or smartphone with the photo application was for participants to link their everyday life outside the school with their activities inside the college. Participants should not only become familiar with the college, they should also have the opportunity to connect their everyday life with its specific learning options with the college. The idea was for the personal mobile device, conceptualised as a key cultural resource of participants, to function as a link between two contexts, which are usually alienated by the rules and regulations of educational institutions. Because the workshop was linked to a media course, participants were invited to process their photos by means of new presentation software, *Prezi*. They were also given the opportunity to have one image printed on a t-shirt. Because the photo activity was intended to link the context of the college with the context of everyday life the facilitator invited participants to bring photos from home; *home* represented the personal sphere of everyday life.

Whilst working on their Prezi presentation, participants selected one image, a photo taken during the investigation of the college or which they brought in from home. It was up to participants to decide which image they printed on their t-shirt. At the end of the two day workshop, participants gathered as a group all with their workshop t-shirts but each with a different images on it. Participants liked this very much, because the t-shirts visualized and represented their personal identity within the social unit of the new group. But they retained individualism by means of the

different images. The way in which participants positioned themselves in relation to the new college environment became partly visible. The still lifes of the photo excursion through the college (see Figure 1 below) contained subtle messages of participants to the college, among other things, that they see the college as an artificial site. Thirdly, the intention was for specific resources in the participants' personal contexts to become visible, especially for the facilitator.

At one level, different images can be read as portraying differences in individuals. These differences are an expression of a variety of contexts, resources in contexts and access points to contexts which are important because they are part of participants' individual learning habitus.

The photos depicted on the t-shirts portray the college from the perspective of young artists and afford us certain insights about the participants as individuals and as learners in relation to media design. They portray participants as being professionally-orientated and as possessing experts, not novices or outsiders.

Figures 1: Images of the school in the style of artistic still lifes: a calm garden environment with a bench and a tree; details from the floor from the art studio; mannequins from the fashion department; toilet sign

In addition, the images convey messages about context relationships of high relevance to the facilitator, namely interest in media design. This implies that the focus need not be on extrinsic motivation, but instead on the provision of professional equipment relevant to Internet design and to social media within a professional context of fine arts and design. Participants would seem to expect, albeit at a low level of awareness, a context for design and communication with media practitioners which the college needs to take seriously.

The t-shirts represent different themes, some of them closer than others to the college as a formal learning context. Two types of images refer to the formal media curriculum. For example one young woman shows herself as a Manga specialist and specialist in entertainment media. The t-shirt image displays the faces of the two protagonists of a manga cartoon for young people, *L vs. Kira*. By making this choice, the participant refers to the media design focus of her course but with clear reference to media and design styles outside of college. Some participants refer with their t-shirt images to the Internet and social media. One participant presents himself as a dancer by using a photo from his Facebook site. Another, a young

woman, wears the well-designed characters MEHR on her t-shirt. Yet another opts for a stylish and also well-designed combination of faces and characters. One young man chooses a photo of a fashion model. The message is about perfection in the use of the Internet and a good understanding world of design.
Rather distant to the college's learning context are images which show their own home, their family and peers. One t-shirt features photos about friends. The style is that of a photo album. The young woman who wears this image on her t-shirt is probably looking for a familiar context with peers within the college environment. A foreign national flag on a t-shirt opens the context to politics and national identity. A young man features his national colour on his t-shirt; perhaps it denotes being politically aware as a migrant.
Each t-shirt image opens a personal context such as the Internet or the home. Some of these contexts are in greater proximity to the media course, for example, the media images compared to the national colours. All images provide an opportunity for understanding the personal development of the bearer. All t-shirts together comprise and embrace a small cosmos of diversity but with several streams, including the baseline of the course, media expertise.
The question arises how to deal with the diversity of the course-related contexts, which are depicted by the t-shirt images. Our proposal is to find an educational and didactic response in relation to the issue of social justice (see Bertelsmann Stiftung, Institut für Schulentwicklung 2012, 17-21, 25-36).
The educational fine-tuning required for making formal educational opportunities relevant relates to scaffolding of developmentally-orientated learning, which is one of the design features of the t-shirt example. Another element is the recognition of the expertise of students, as photographers or as manga experts of youth culture. Such an expertise is a cultural resource, which is not in the foreground of the curriculum. But from the perspective of the curriculum, a teacher – as agent of the institution school – has the option, increasingly even an obligation, to recognise such non-curricular competencies of learners. This issue of cultural resources was discussed in *Review of Research in Education 35(1*) under the heading of cultural resources in the process of globalization. Wortham's (2011) focus is on the recognition of youth culture within the processes of globalization and migration: «globalization has transformed youth cultures, bringing resources from around the world into practices that are nonetheless tied to local cultures, histories, and material constraints» (ibid., ix). That means in practice that schools need to «appreciate the full complexity of youth practices – not just their heterogeneity and rapid emergence but also their reflexivity» (ibid., viii). Rymes (2011) stresses the potential of resources of youth culture because «they encapsulate shared experience and deference to complex, collective social understanding» (ibid., 208). From this perspective, and on the basis of published research, Rymes identifies

two relevant curricular strategies to deal with the resources of youth culture in school, the «deference approach» and the «denial approach». The denial approach corresponds with critical literacy. Teachers motivate students to deal critically with mass media in order to achieve their own means of constructing meaningful media texts. The deference approach targets the assimilation of cultural resources of young people into teaching and learning. The recognition of global youth culture and associated linguistic and discourse habits as legitimate resources for learning is a prerequisite. Our intention is to utilise Rymes' deference approach for the planning and evaluation of future mobile learning interventions.

Summary

Our line of argumentation started with the ‹mobile› delimitation of mass communication as a structural feature of ongoing modernization that corresponds with a changing constellation for learning. With reference to the widely used notion of a ‹global knowledge society› we considered learning processes, learners' capacities and learning outcomes as well the new mobile devices of mass communication as cultural resources. Through this, we dealt both with the ideological perspective of neoliberalism, which views resources in terms of exploitation, as well an opposing ecological view, which we linked to culture. With reference to existing theoretical endeavors in the fields of media and ecology, we drew on Gibson's (1979) ecology of perception and applied his concept of affordance to the new individualized mobility of mass communication and learning. A triangular structuration model with its feature elements of agency, structures and cultural practices served as hermeneutical tool for describing and analysing the affordances of mobile devices, in particular media convergence in the context of social networking and teaching and learning as a set of conversational processes. In this context we considered the pedagogical task of operationalizing the use of mobile devices for teaching and learning with particular reference to planning and evaluation. For this purpose we proposed four parameters as well as six focal points for planning of scenarios for mobile learning. Finally, we provided an example context-aware learning. The example, in which mobile devices supported the investigation of a college as a learning environment, discussed the affordance of mobile devices in formal and informal learning contexts combined with representational means such as social networking sites.

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Themenheft Nr. 24: Educational Media Ecologies

Building as Interface: Sustainable Educational Ecologies

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Abstract

This paper begins with the most obvious, and yet most elusive, of educational media ecologies, the buildings which are ‹home› to pedagogic communication and interaction, and considers how we might understand «building as interface», construed first as a noun, («a structure with roof and walls» – OED) referring to places as physical structures, and then as a verb, («the action or trade of constructing something» – OED), referring to the activities of construction through which we can engage technologies central to theory, research and practice. Our concern is with exploring the larger question of educational sustainability: with what ‹sustainability› means when applied to a specifically educational context, and with the sustainability of the kinds of emerging educational environments in which new information and communications technologies play a significant role. This question of sustainable educational environments is driven by a need to be responsible and accountable for the impact of the technologies and practices we eagerly embrace in the name of «21st century learning», even as prospects for a 22nd century are so rapidly receding from view. As one prominent media ecologist put the point: «we have to find the environments in which it will be possible to live with our new inventions» (McLuhan 1967, 124).

Sensory space and a sense of ‹place›

Why is it important in new media studies to think about environments? We have not always been environmentalists. McLuhan, for example, took a dim view of ‹environments› and ‹environmental thinkers›. Environments represented for him totalizing misconceptions, ecologies of not-seeing, because environments immerse us in ways that evade critical consciousness. Environments epitomize the taken for granted, the unquestioned, the imperceptible; they are «[…] not passive wrappings, but are, rather, active processes which are invisible. The ground rules, pervasive structure and overall patterns of environments elude easy perception» (McLuhan 1967, 68). Environmental thinking, based on McLuhan's view, is concept-driven while percept-blind, so it goes on, but it has no idea of where it is going. In «The Future of an Erosion» (1967), McLuhan speaks of environments as total, as saturating and as invisible, comparing them to what Ellul (1965) talked about

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as «propaganda». The usual example offered is fish in water – if that fish can be said to know anything at all, what it absolutely cannot be said to know is that it is indeed in water. Trapped within an immersive world-view, we are, to use another McLuhan-esque metaphor, in effect «anaesthetized:» we are asleep, and worse yet, sleep-walking. What we need, he says, is to be made to «wake up» from our environmentally-induced stupor.

Required for that wake-up call are what McLuhan called «anti-environments» – configurations, actions and expressions that challenge the inertia of the environmental paradigm, disruptive means that incite critical engagement and thought, unseating our concepts and disorienting our percepts. In McLuhan's elegant if invariably cryptic style, well-formed verbal and artistic expressions, which he called «probes», aesthetic and rhetorical «counter-environments», could do the work of rousing us to critical consciousness about the environments in which we are sleepily immersed. One good, if limited, way to both ‹probe› and to ‹wake up› those who approach the use of advanced technologies for education in the spirit of fervently un-critical ‹true believers' is through the straightforward empirical tracking and reporting of the energy consumption and environmental costs of the tools and resources we routinely use in the course of teaching and learning. While this kind of ‹wake up call› has resource conservation and not education as its primary purpose, the two are not mutually exclusive; they complement each other in edging us towards a radically different view of the educational enterprise – both as physical and metaphorical structure. A specifically educational concept of sustainability, therefore, extends beyond consideration of physical resource consumption to an ecological assessment of a pedagogical ‹plant› and its ‹processes› that involves serious study of the designs, uses and conditions of the buildings in which we do our educational work. McLuhan contends that, «Environments… are not just containers, but are processes that change the content totally» (1965, 200). If media ecology is the study of media as environments, then media ecology may also legitimately extend to the study of environments as *media*.

Though he was speaking of media, and not buildings, McLuhan's insights apply as usefully to the latter as to the former. Both, after all, are «complex communication systems» (Nystrom 1973, 23) in which «communications media, technology, technique, and processes» interact with «human feeling, thought, value, and behavior» (ibid.). Both «affect human perception, understanding, feeling, and value» (Postman 1970, 162) and both function as media environments. A building «structures what we can see and say and, therefore, do», it assigns roles to us and insists on our playing them; it specifies what we are permitted to do and what we are not» (Postman, ibid). Values, actions, practices, bodies, identities and relations are mediated in and through structured spaces of special-purpose inhabitation, such as a university faculty of education.

An Ecology of Place: Simon Fraser University's Faculty of Education Building

In one such structured space, we conducted a small exploratory study that speaks to this question of how a building can be a matter of concern for educational media ecologists. The study concerns itself entirely with the physical plant that is the Faculty of Education building at Simon Fraser University, where I (de Castell) had taught for nearly 35 years. After such long a time, no one could be more deeply asleep and less consciously aware of this environment than I. However, a singular provocation nudged me into wakefulness about the need to understand how this building was shaping and constraining all the work we did there, including all the ways we spoke – and failed to speak – about the building and its perceived impacts on lives and our work. I moved temporarily, for a year's term, from Professor to Dean *pro tem* of the Faculty of Education at a time when students and instructors who inhabited one particular classroom had begun to get sick – headaches, allergic reactions, nausea were all reported (they had been intermittent before, and there was some, but little, discussion of it before we all got back to ‹normal›. These reports prompted a physical inspection of the space, which in turn revealed how the building was interfacing with its inhabitants: significant deterioration, airborne particulates, leaks, draft, dust and toxic levels of mold. The room was required to be closed off, stripped down and restored to a ‹healthy› condition (in fact, now, a few years later, whole wings of the same building are being quarantined due to severely high asbestos and black mold levels). People and resources were assigned to tackle the institutionally defined problem of environmental health and safety. A second classroom proved to be in a similar condition and was also closed down, and then restored.

For some years now we had all been aware, whether by personal encounters or by hearsay, of the presence of vermin, insects and rodents co-habiting with teachers and students. In addition, cracks in the concrete meant water dripping on to and leaking into walls and floors (much of British Columbia is rain forest), fungus grew on windows and sometimes into window frames, and the Dean's office shared the problem to such an extent that the next Dean actively avoided spending time there, suffering allergic reactions in that space. Today there is an extensive process for research, reporting, and reconstruction of that building on-going, and meantime some faculty members have relocated to other sites in the university, increased their work from home, and some have refused to attend meetings held in the building. The ‹interface› has become aversive and dysfunctional for its users, and the value of its contribution to educational work correspondingly diminished.

In North America, many other faculties of education were built around the same time as Simon Fraser University's: there was a ‹boom› in such building, in part due to the recently elevated status of the discipline from a field of practical knowledge to one concerned with theory and research, and with it, physical relocation of

education from ‹normal schools› to universities faculties. Architecturally, the design of these newly conceived faculties of education would be guided by its traditional pillars of function and form, of aesthetics and purpose – regulated by considerations of economic efficiency: public schools were not supposed to be, as a rule, lavish. And, like the public school buildings which long preceded them, education faculties were at that time guided both functionally and aesthetically by the educational ideology of ‹progressivism›. Uncomfortably stretched between the prior era's classicist heritage and the incoming technocratic imperatives of economy and efficiency, the design discourses of these new faculties of education featured references to cultivation, growth, student-centeredness, intimacy, small group collaboration, open-plan instructional areas and democratizing community spaces. The material execution of these ideologically progressive intentions, however, was, indeed like progressivism itself in the post-war era, largely trumped by the industrial aesthetic of the 60's and 70's.

No less uncomfortably, if largely unconsciously, faculty undertook to nurture the next generation of progressive teachers within factory-like environments designed for the cost-efficient induction of its novitiate. The Arthur Erikson-designed building, which we moved into in 1979, included low ceilings graced with brightly-painted factory-style heating and ventilation systems, unpainted concrete walls, covered in places with either burlap or (as this is BC, and once a logger's paradise) with large rough cedar or finished pine panels, plenty of glass and metal, and free-standing tables and chairs, or carpeted moveable blocks for seating. Picture-window ‹views› looked out onto patios and gardens and deep green forest only slightly more distant, making the ‹natural› environment itself a kind of public art. This was our brand new education building – which we all thought wonderful light, airy and very, very much up to date.

Fast-forward to the present day, and many of these similarly designed education faculties are showing comparable signs and symptoms of their age. But now, unlike at any previous time, we have come to realize the steep environmental costs of these purpose-built facilities, in concert with their technological limitations. A faculty building is a user interface for the educational enterprise within it. The question everywhere becomes whether to «recycle», that is restore and repurpose, buildings that were designed with a bygone mindset and erected for a modernist, literate culture, to support education for a postmodern digital one or whether to demolish those old buildings, and build new environmentally conservative and technology-enabled ones. Indeed do we, in this era of online learning and mobile technologies, break out of our dependence on stable and centralized physical buildings altogether? What will produce the right kind of environment to «enable us to live with our new inventions» (McLuhan 1967, 124).

Sustainable Educational Ecologies (SEE): A Case Study

How can we determine the best course of action for dealing with (and working within) deteriorating and outdated educational environments and as likely, if not so obviously, a deteriorating and outdated learning experience? It was to respond to those questions that we initiated an exploratory project called Sustainable Educational Ecologies (SEE) whose purpose was to make possible the ecological assessment of Simon Fraser University's Education building, *as an educational interface*. In the course of this project we created a multimodal documentation and analysis tool capable of making the educational constraints and affordances of our physical environment more explicit, to help us determine the kind of educational ecology our building supported, and whether, as a specifically *educational* ecology, it was indeed both sustainable, and worthy of being sustained (http://www.sfu-see.ca/)[1].

This was a collaborative, faculty-wide project aimed at breaking new ground, both conceptually and methodologically, towards the development of a theoretical and operational model of educational sustainability. The project involved six teams of graduate research assistants, each led by a faculty member from the Faculty of Education. Faculty members' areas of specialization ranged from infrastructure sustainability, place-based education and learning environments research, to pedagogies for ‹learning in depth, systems of delivery and internationalization of education.›[2] It should be stressed that in this exploratory project we asked a diverse set of researchers to identify and pursue a question *they* felt ought to be considered in an ecological assessment of educational environments, and the resulting set of questions is by no means presented as an exhaustive or even a comprehensive set. Indeed, these particular questions about a field very new to us all can claim to be no more than randomly placed first steps, as chosen by this particular set of researchers – but they gave us, nevertheless, a way to begin this complex and unfamiliar trajectory of inquiry. Each team engaged with a specific aspect they particularly identified as contributing to an overarching notion of educational sustainability, and each was challenged to find ways of overlapping with the work and ideas of other teams (see Figure 1). We began ‹in place›, from the outset demarcating the research field in concretely[3] physical terms, a starting point that suggested a metaphor of the building itself as an interface for our

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2 Faculty members involved in this SSHRC-funded project included Dr. Suzanne de Castell, Dr. Kieran Egan, Dr. Kumari Beck, Dr. Roumi Ilieva, Dr. Bonnie Waterstone, Dr. Michelle Nilson, Dr. David Paterson, Dr. Kevin O'Neill, Dr. Stephen Smith, Dr. Sean Blenkinsop, Dr. David Zandvliet, assisted by graduate research assistants Milena Droumeva, J. Melanie Young, Mathew Menzies, Greg Scutt, Olivia Zhang, Carlos Ormond, and Jacqueline Ashby.

3 Anyone who knows the university understands that speaking of ‹concrete› with reference to SFU is itself resonantly metaphorical: this apotheosis of late 60's education architecture remains a tribute to concrete in all its forms.

several forms of inhabitation. This gave us a way to assemble, meaningfully and in a ‹convergent› rather than simply additive way, the data the project's six different studies were contributing. We sought to represent – through various media and visualization approaches – what it meant for diverse kinds of stakeholders to inhabit such a place. This interdisciplinary collaboration required a way for the project's varied concepts and forms of data to both have a voice and to speak to one another.

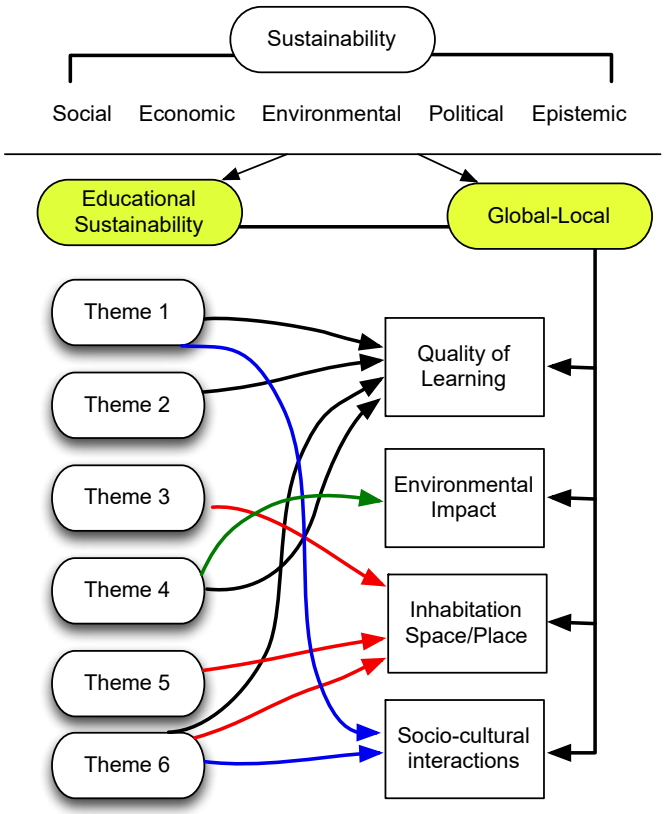


Figure 1. The array of themes and nexus of connections between our teams' explorations of educational sustainability.

Designing an interdisciplinary discourse

Metaphors, highly resonant and simultaneously semantically eloquent and semiotically generous (Janesick 1998), became our medium for articulating an ‹infralanguage› (Latour, 2005) for communicating across the project's different research teams, helping us bypass and escape, temporarily at any rate, some of the normative constraints of discipline-specific discourses that impeded our varied teams' abilities to represent their purposes and assumptions, and to work together across disciplinary lines.

The building is the interface between inhabitants and habitat, and it is at this interface that the sustainability of co-habitation practices and purposes are supportable – or not. So, we decided to utilize the building as a ‹semantically impoverished› and yet semiotically rich ‹infralanguage› to draw together from diverse kinds of work a shareable conception of educational sustainability. By directly relating our research aims to the specific locations within which the activities in question were carried out, we sought to productively align information of the diverse sorts collected by our multidisciplinary team, into a relatively cohesive interdisciplinary whole.

In the process of our team meetings, the restrictive and reductive languages within which both sustainability discourses and architectural design discourses are typically framed added to the importance of building a new, ‹stickier› theory, to which a greater variety of relevant ideas and information could be attracted. A different kind of intellectual ‹building material› is demanded for breaking open such new questions. And, we wanted to place education and the educational experience/practice, not economics, aesthetics, or environmental studies, at the center of our inquiries and from there explore connections to other material and socio-cultural dimensions of educational sustainability. This meant we needed our focus to be on teaching and learning, pedagogy and curriculum, not on greenhouse gases, emission control or architectural engineering.

The SEE *place-based* education research team's report stresses that all education happens «in place.» That focus on the educational importance of experiencing and understanding place is central to ‹educational sustainability› because, as that team's researchers explain, «the relational dynamics and modes of exchange that constitute educative action are essentially place bound» (Blenkinsop and Scutt 2010).

> To be at all – to exist in any way – is to be somewhere, and to be somewhere is to be in some kind of place. Nothing we do is unplaced. How could it be otherwise? How could we fail to recognize this primal fact? (Casey 1997, ix)

Here place is not a backdrop to education, the physical space in which educational communications and interactions are housed, but is, in this team's words, «itself pedagogical». This idea of place-as-pedagogical construes the environment in similar terms to the educational theories of Reggio Emilia, as a «third teacher» (Gandini 1998).

Other teams concentrated on pedagogical decisions, student satisfaction, the costs and benefits of internationalization, the functions and uses of space, while the ‹place-based education› team's focus was on cultural practices, the ‹internalities› of the larger political-economic-technological processes more usually examined in sustainability studies.

Critical to our collective enterprise was a conception of our Faculty of Education as an educational place that was much more than just a physical container for its

inhabitants. We did not want to restrict our analysis to what the field of architecture has far longer and far better known how to do – design and analyze buildings as aesthetic and functional housings for human activity. We wanted to build a discourse that supported an expansion, not a reduction of the ‹externalizing› perspectives of mainstream approaches, whether of environmental sustainability or of economics or of architectural design, that could acknowledge education as a speaking subject. Using the concept of an ‹interface› allowed us to conceptualize and externalize – through the use of actual multimedia interfaces – some of the key (and oft-neglected) relationships between physical structures and pedagogical constructions, between educational edifice and educative experience. Taken as a metaphor, the interface signals both the affordances and constraints of this educational sustainability interchange. Interfaces, after all, are ways of directing, restricting and facilitating user interactions with a system (in this case, the education system both in its physical and cultural permutation). They allow and encourage certain types of actions over others, just as environmental paradigms for McLuhan (1967) predispose us to certain kinds of perception, thinking and action over others.

Building as Interface I: Building as a Noun

Recalling McLuhan's insistence on the need to ‹wake up› from the myopia of modernist, literate schooled insensibility, our project called for a re-humanized, embodied approach that could – even if only aspirationally – encompass multimodal, multisensory information to bring very diverse kinds of information together, bridging not only the gaps in our own teams' particular sub-disciplines, but integrating qualitative and quantitative data on the sustainability of educational environments. Our project is similar to the «unique experiment» described by McLuhan aimed at establishing the «sensory thresholds of the entire population of Toronto» (McLuhan and Zingrone 1995, 228). As to the nature of the project, as McLuhan explains, it intends «to measure, quantitatively, the levels at which the entire population prefers to set its visual, auditory, tactile, visceral, and other senses as a matter of daily use and preference-how much light, how much heat, how much sound, how much movement […]» (1995, 228).

While we weren't looking to establish *preferences* as such, the SEE project dealt with a similar kind of ‹experiential› question: a mapping out of the sensory and material sphere of the educational structure. To that end, our study was assisted by the ecological and ethical aspirations of the nascent field of ‹metadesign›, in that we were attempting to gather and to draw together into productive interchange, both quantitative and qualitative information about an entire population (though of a single building, and not an entire city). So, rather than conceive of that place as a ‹housing›, a ‹container›, or an ‹enclosure›, we began to think of it as the ‹interface›, the point of connection and communication between a

physical space whose material qualities could be identified and analyzed, and the activities of its human inhabitants, whose quality of experience could be captured and studied in direct relationship to the physical features of the material space inhabited. This conception of the building helped loosen us from the reductive grip of externalizing discourse, and helped us to think within and across techno-scientific, economic and architectural design languages, in order specifically to try to encompass the multisensory quality of inhabitation and to trace how a physical structure and structures of educational experience converge and co-operate. Using a combination of light and sound readings as well as photography of typical spaces and objects as a type of ethnographic multimodal documentation of the faculty building, we developed a number of visualization tools to externalize the metaphor of ‹interface› and allow us to look more holistically at the various factors contributing to the faculty's overall educational sustainability (Figure 2). As well as

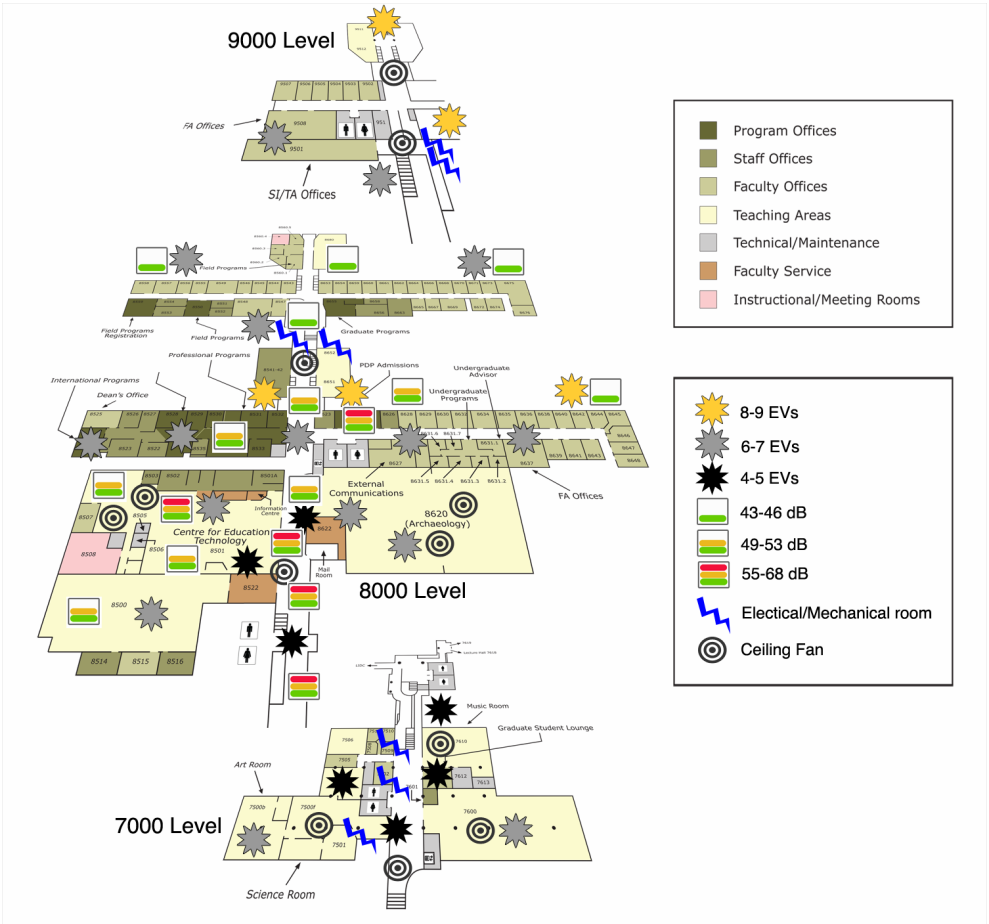
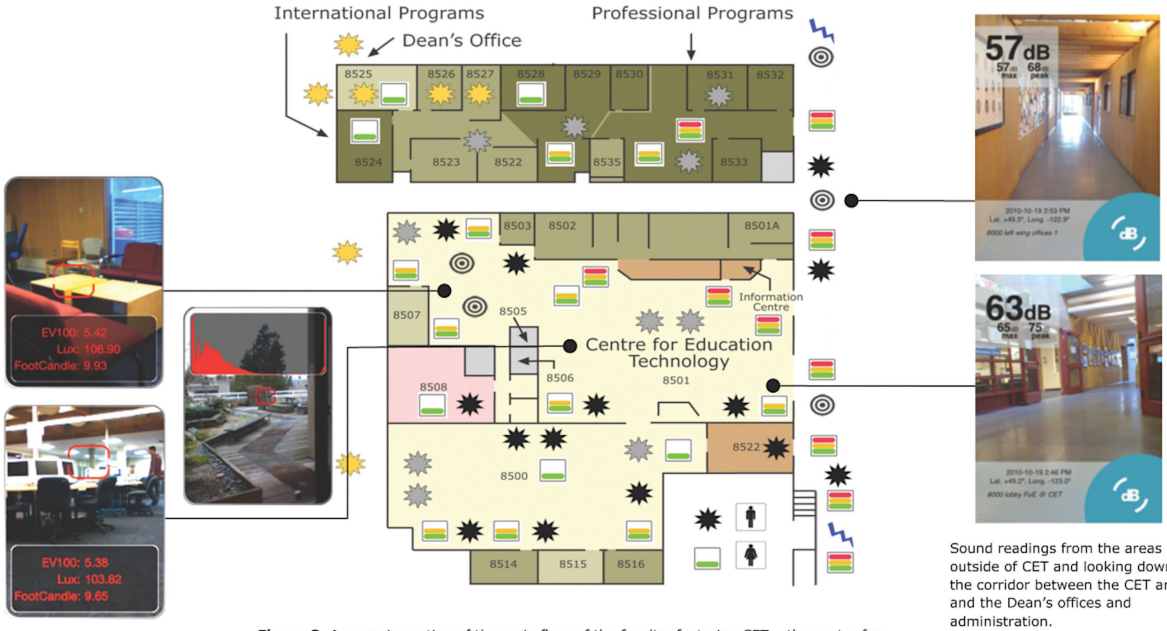


Figure 2. The 3-tier floor plan of the Faculty of Education with environmental parameters overlaid on top. Legend to side.

spatializing institutional functions, we collected and represented sound level and light meter readings for each floor, area and space of the Faculty of Education, overlaid photos from corresponding locations, and displayed gradations of each environmental parameter onto the map.



Light readings with photos of the actual area of CET, and side deck.

Sound readings from the areas outside of CET and looking down the corridor between the CET area and the Dean's offices and administration.

Figure 3. A zoom-in section of the main floor of the faculty, featuring CET – the centre for education technology, which is the main student computer lab, social gathering space and faculty information desk. It is characterized by low ceilings with exposed piping and vents, and even though it looks onto a nice deck, it is poorly lit with mostly artificial lighting.

In addition, we developed an interactive Flash-based prototype representing the building-as-interface that takes the form of an annotated floor plan of the faculty's main campus, where most researchers and participants work, study and teach. The blueprints were colour-coded according to room purpose – teaching facility, faculty offices, technology center, program administration, graduate studies, professional teacher training classrooms, labs, etc. Concern over functionality is typically where institutional cost analyses of university facilities end. Our study sought to go further, specifically in the direction of how to represent and assess the quality of inhabitation, in terms of its experiential and sensory conditions for inhabitants, as well as the quality and experience of learning. Thus, in addition to photographic overlay and sound recordings from different spaces, the interactive map includes narrative data in the form of ‹talk bubbles› relating to specific areas on the floor plan that contain informant quotations reflecting on their experience of inhabiting the Faculty. Furthermore, SEE's floor plan interface can support further annotation, with additional interview data from a variety of stakeholders, as well as

with additional empirical information on energy consumption, air quality, light and sound levels. For full documentation and study descriptions, please refer to our full final report, available on www.sfu-see.ca[4] (de Castell et al., 2010).

This creative approach to construing our Faculty's building as an interface helped us see relatively straightforward ways of bringing physical and experiential information together in a way that builds on McLuhan's project to ‹establish sensory thresholds› of a population. Interestingly, when we compared user reports with physical measurements of light and sound, we discovered significant variability: in spaces with very high levels of objectively measured sound, subjects did NOT necessarily experience those locations as ‹noisy› or ‹distracting›, as they did in other spaces whose objective sound levels were considerably lower.[5] This inconsistency flagged a need to learn more about the kinds of activities which appeared to mediate – and mitigate – otherwise distracting sensory conditions. A number of interviewed participants spoke of the hallways as being particularly rich spaces for social interaction as well as academic exchanges – yet such spaces are notoriously loud, resonant and dark locations. In essence, perceptions of sensory characteristics of space were shown to have much more to do with contexts of experience as well as purpose and cultural expectation, than with objective sensory qualities alone.

Liz Ellsworth's exemplary book *Places of learning: Media, architecture, pedagogy* (2004), features an important theoretical discussion of what a design is *intended* to convey or accomplish, and how a structure's design anticipates the movements and meanings made by its occupants and visitors. However, there are a myriad ways a person can take up the affordances of a place, so while we can theorize about it, we cannot explain in any objective terms how a designed space will most likely work in actuality, nor have we, therefore, any solid basis for expecting a specific experience or activity in such a place as being either ruled out or assured. Sensory experience is likely as much an individual as it is an institutionally-defined phenomenon. To that end, one of the teams focused their ‹learning environments› research (Zandvliet, Ashby and Ormond 2010) on trying to determine what inhabitants actually experienced in in their various classroom locations.

For the most part the literature on educational environments has not told us much about objective connections identifiable between a physical environment and student reports of feeling engaged, or feeling ‹at home› or finding a space conducive to collaboration. Thus, possibly important connections between user experience and physical environment remain unknown. Even as we may want to infer such connections based on theories drawn from psychoanalysis, social psychology, semiotics or elsewhere, we have not yet developed any concrete methods or tools for studying these connections. Eric Klopfer (2011), in criticizing

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5 This was a pilot study; any reported results should be regarded as anecdotal.

the idea that randomized controlled clinical trials are the ‹gold standard›, for good research, explains that,

> … classrooms and other learning environments are complex systems. Complex systems have a property by which very small differences in initial conditions (e. g., student or teacher attitudes and knowledge, classroom culture, schedule,) can lead to widely varying outcomes. So, the «same» perturbation instituted in the context of the «same» classroom may yield widely varying results when those similarities vary ever so slightly. (1)

To understand these complex systems, models like the one we have articulated here may, in Klopfer's words, «help make sense of research across interactions and methodologies. «The primary purpose of many of these models», he continues, «is for sense-making, and integration across interactions and methodologies, not prediction» (ibid., 2).

Tools like SEE's provide a conceptually externalizing instrument for helping us think about and better understand the many interconnected systems that comprise a lived environment, and explain the variables that condition the ways inhabitants mobilize or disregard different material aspects of their environment, as they go about the business of its inhabitation.

Building as interface II : «I seem to be a verb» (Fuller, 1970)

Turning from nouns to verbs, Ursula Franklin long ago contrasted the ‹artifactual sense› of technology with its ‹social practice› sense, stressing that it is the social context of its practical use that we are referring to when we speak of ‹technology›, but all too often that situated social practice is elided in favour of its nominal form – technology as a ‹thing›. Social practice is our interface with artifacts, it is how something becomes a ‹thing› at all for us (Latour 2005, 3). For new and emerging artifacts, that interface is design, development, and production: in a word, an engagement with building. Building, so seen, is the interface that conjoins, in a transactional relationship of mutual constitution, technology and people. In this sense, ‹building as interface› refers to how the work and play of construction mediates interconnectively between and among agents both human and not. In the most obvious of senses, education is a practice of ‹building›.[6]

For many of us teaching with technologies, turning from nouns to verbs means cultivating a «production pedagogy« a pedagogy of doing and making, and in the case of increasingly popular design disciplines – of building (Thumlert, de Castell and Jenson 2014). In terms surrounding the design, development and uses of digital tools for learning, the question is always how users can most productively realize

6 First and foremost, of course, education is about the intentional formation of a ‹self›. Who should do that building? Old sayings about teaching someone to catch fish versus giving them a fish come to mind here, and, trite as that is, it is clear which approach is more sustainable, whether of fish, or of education.

the actual and possible educational functions and uses of digital affordances. Powerful learning happens through design-based research and design-driven theory, through prototyping and testing, then remaking and re-testing digital tools. Referred to by the New London Group (1996) as «critical making», the role of design and production has been argued as key to educational reform for multimodal, 21st century literacy pedagogy. But can we take this technology-intensive educational agenda forward in a responsible and sustainable way?

Very much in line with the hegemony of consumer culture, it has long been taken for granted that the best educational software will be created not by educators or disciplinary specialists, but by technical specialists in digital design, computer science, and software engineering. The level of expertise required to create good educational software, it's argued, is far different from and far exceeds, the knowledge and skill of education professionals, and indeed parents and students more generally. They do not, after all, even do the same kinds of work Interestingly, the question of whether school-age students can best learn through design and production is still very much on the table, at least in theory, if less present in classroom practice. But it is a question far less often asked about teachers, still consigned to occasional ‹how to› professional development workshops on new (commercially produced) software to support their uses of current and emerging digital resources for learning. There are plenty of reasons why we educators have been so much more disengaged than our students from the activities of design and development, (Bryson and de Castell 1998) and contesting this particular «distribution of the sensible» (Ranciere 2006), about who can and should do what with respect to building educational materials has a long history. There are important lessons already learned about reliance on the marketplace of educational materials and about what is lost, both educationally and economically when teachers no longer have «producer-like» understandings of the educational resources they are using (de Castell and Luke, 1986). Digital learning management systems are not so dissimilar to previous incarnations of text-based learning systems that teachers could ‹administer› to students without needing to understand, themselves, the bases on which needs analysis, diagnosis, and remediation were delivered – through such ‹specialized› teaching tools, teachers were long ago rendered into consumers of educational resources where they had once been producers of them. Then, as now, technology was willingly taken up in place of technique and much of pedagogical decision-making consigned to the marketplace.

Building Interfaces for Learning

Designing sustainable educational ecologies, ecologies that consider building as interface for learning, as mediators of educational experience, means transitioning to a paradigm of students and teachers as designers and developers of new and

emerging technologies, not just as users and consumers of them. To understand a ‹production pedagogy› of doing and making means acknowledging the limitations of the modernist educational paradigm of critique as the essence of an educated person. That educational ideal of critique, as people like Gunther Kress (2003) have eloquently argued, has run its course. We do not so much need education to cultivate critical consumers as we need it to cultivate critical designers, makers, producers. In many ways, the phenomenon of Web 2.0 has, in educational circles, ideologically engendered the culture of «consumer citizenship» as a core way in which children become part of a new media market (Banet-Wise 2007, 8). At the same time, contemporary media scholars foreground the idea of «active participation of a distributed social network in the production and circulation of culture and knowledge» (Ito et al. 2010, 19). As Kress (2003) points out, whereas critique subordinates the students' creativity and intellect to, first and foremost, understanding someone else's design, out of the activity of production (building), a new and far more engaged and informed species of critique can flourish. The principle of ecological validity underlies production pedagogy – don't just learn *about* something, learn *to do* it: real doing and ‹critical› making, as the New London Group (1996) has named this process. (see also Boler and Ratto 2014). Courses can be production-driven. So, for example, doctoral students in contemporary curriculum theory class can design a course on contemporary curriculum theory in their own area of specialization. Students in digital games for learning courses can work in teams to prepare design documents and prototype their own learning game. Research methods students can conduct mini research projects, through each step, from conception to execution, through peer review, ethics review, fieldwork, coding, presentation, and final research report. How much more can be learned from this approach than from only reading and critiquing the research done by others?

Might not faculties of education greatly increase the interest, effort and resources given to building capacity among faculty and students to become digital curriculum designers, developers, and evaluators – *producers* of the programs students' laptops run, and in which universities are currently making considerable extra-local investment? Models of this kind of paradigm shift are currently at work in the «laptops for all» programs in South America, programs that, ironically enough, have been widely discounted as prohibitively expensive in economically far more developed European and North American jurisdictions. Specifically instructive examples are the professional development programs for teachers in Argentina and Uruguay in which teachers are being asked, and supported, to take on an active, participatory design and production roles in the creation of digital learning resources for students' (free) school laptops.

From the standpoint of educational sustainability, technology maintenance for Uruguay's free nation-wide laptop program demonstrates that supporting students in becoming technical experts could be an effective and affordable on-the-spot way to maintain vast numbers of widely dispersed and heavily child-mangled computers. If teachers were similarly to become more involved in the design and support of their own resources, while we can certainly expect things to move more slowly, it also stands to reason that the use of local resources – which requires a good deal of new learning by local inhabitants, pays off over its admittedly slower time. It is quite possible that for educational sustainability, it makes sense to move more slowly, in ways that afford teachers and learners a basic working literacy with the medium in which they are currently expected and required to receive and to process information. Public funding might be provided, not for what is built best, an object, a noun, so to speak, but in what is a more modestly processual form, building (v.), the built's slower, but ultimately more sturdily sustainable cousin. On this view it is not what is built best, but rather, in the spirit of the contemporary crafts and DIY movements, those things you can best make yourself, «what's best built», that will advance sustainability of our networked digital media ecology. This argument echoes the Habermasian refrain, no less worthy for its frequent repetition, «in a process of enlightenment, there can only be participants» (Habermas 1975, 40). Education is properly neither a spectatorial nor a consumerist engagement, it is an active, situated, knowledgeable, and skillfully productive one. Or it is no education at all.

In education, (unlike schooling, where «seat-warming» can often gain students years of credentialing) if you are not an active participant, you are not in the game at all. To be taught about and to learn about one's world is to be made aware of its «affordances», a concept by now familiar. A kind of philosophical prehistory to Gibson's (1977) formulation of this concept of affordances can be discerned in John Dewey's contention that «the organism selects its own environment», in Dewey and Bentley's (1949) supplanting of theories of organism/environment interaction with the more enactivist theory of ‹transactionalism›, and in George Herbert Mead's (1934) concentration on the «world that is there». The key point in all these cases is that no matter what might be «objectively there», it's what is «there» for a specific actor in a given situation that is actually operative, an ontology of «what is, is what is practicable.» Mead's, long ago, was a call to attend to verbs, not nouns; it was an understanding that what can become an object for us is only that to which we make or find a relationship) For anything to be an ‹object› to us,[7] Mead argued, for it to populate our world, it must be something we are able to and prepared to *take up* a relation with, our active engagement transforms an object from its inert

7 This is a matter on which considerable light has already been shed in earlier work (Friesen, 2004) on ‹learning objects›, work that seeks, similarly, to prod along educational thinking about technology from nouns to verbs.

condition as a noun (like «edifice»), to something more adverbial (like «habitably»). Language partly captures but also invariably reduces, and can only hint at, the complexity of the multisensory experiences it seeks always incompletely to express. «Language is the efficient ordering of the enigmatic abundance of the world … we are imposing on reality the nouns we invent … every noun is an abbreviation» (Borges 1999, 21).

It is the activity of building that constitutes an essential interface between digital technologies and their users, and that a producer-like, not just a consumer-driven relation to technology is no less imperative in today's networked mediascape than it used to be imperative that literacy learning entailed learning to write, and not only to read. A system that produces its own future capacity is very obviously sustainable in ways a system that depends on purchasing that capacity at ever increasing cost is not. And an ecology that demands its inhabitants learn, themselves, how to maintain it, is as instrinsically educative as it is equitable.

Crafting a Sustainable Education

We have evidence at every turn that we can no longer pursue business as usual. We must learn to make more and consume less, think globally but cultivate and preserve diversity by acting and producing locally, build rather than buy capacity, and help students and their teachers become architects, designers, and well-informed agents in the building of their own lives and of those around them. In a way, this harks back to education's traditional role of subject-formation, promoting a kind of media ecological ‹selbsbildung›, an active and productive self-fashioning of our interfaces for teaching and learning. This involves, first, being engaged as critical inhabitants of the physical environments we have inherited and those we can build for ourselves, and finding ways to invite and support ongoing user-driven assessments of the constraints and affordances for sustainable learning. Kieran Egan (2008/2011) call this «learning in depth», learning that doesn't fade away after each exam, and, no less importantly, involves finding ways to reduce these facilities' environmental costs and harms, both physical and cultural. Part of this will likely entail using these facilities – these rapidly obsolescing buildings – more efficiently than we have done, less as detention centers and more as open access, flex-time learning centers, by capitalizing on mobile technologies for learning, hybrid pedagogies of both distance and face to face learning. The era of sitting day after day in one after another small classroom with one teacher and the same group of students, year after year, is now as obsolete as its coercive attentional economy (de Castell and Jenson 2004). These buildings and practices were designed for very different times, resources, conditions and media ecologies than our own. A sustainable educational ecology involves, furthermore, concerted engagement in activities of production, teaching ourselves and our students

through critical making of the media in and through which we research, teach and learn, rather than resorting as we have been doing for too long to contracting and purchasing specialists to do the work of alienating us from the means of educative production, and entrenching relations of consumption in their place. Recognizing that the initial artifacts so produced will at first be cruder and vastly more crude, vastly more buggy and vastly less impressive than the market has on offer, we will, however, be doing the essential educational work of mastering the basic tools of our own communicative and expressive abilities, and sharing those tools with others in ways that are both sustaining and sustainable. While in no way competitive with the open market, this trajectory of development will result nevertheless in *educationally* superior interfaces, both material and procedural, and therein lies one good hope to realize a sustainable educational ecology.

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Open Education and *Bildung*

Ideas, Assumptions, and Their Vigour to Transform Higher Education

Markus Deimann

Abstract

We are witnessing tremendous changes and transformations in learning and education due to the advancement of digital technologies. This pertains not only to various forms of e-learning but also to more recent sorts of open online learning environments such as MOOCs or P2P-University. As Bell (2011) has argued, learning theories fall short of explaining change in learning activities as these theories do not consider the complexity of technology, social network, and individual activities. Therefore, this paper revisits the German concept of Bildung *(Formation) to get a better understanding of the ongoing changes in learning environments, especially in informal Higher Education.*

Bildung is a unique concept in German educational theory with roots in the philosophical movement Idealism, and the key figures of Schiller and Humboldt. Humboldt is most known for his theory of education, which states that each individual should fully unfold all his abilities and skills under the umbrella of a «leading force», i. e. the goal of the individual development is to merge all the different skills and capabilities into one. Thus, the task of *Bildung* would be enable opportunities to live an autonomous, critical and reflective life. The goal is to provide a means for realising and preserving rational potential and capacity for self-determination, as opposed to being determined by others, such as society. Marotzki (1990) has proposed a modern theory of education called structural theory of education which depicts education in the form of a self-reflexive processes framed in the life history of the individual and contains a perspective of individual production of sense and meaning.

Bildung's significance is highlighted by the fact that it does not have a counterpart in the Anglo-American culture, it seems indicated to highlight its significance. As opposed to learning, *Bildung* provides a frame of reference to act and behave in response to the demands of culture and society. For instance, it is well known that knowledge or skills that have been acquired in traditional schooling will last a lifetime. However, as traditional patterns such as learning in higher education become more fragile, and more open formats are available, guiding frameworks need to be transformed to cope with changed conditions. This leads to educational processes that are focused on providing guiding knowledge to learn new skills and

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competencies. There is an increased importance of utilizing media for these kind of educational purposes. Marotzki and Jörrisen (2009) provide some examples of the various potentials inherent in media. However, they and other authors have not yet provided empirical evidence to substantiate these assumptions. Consequently, this research project attempts to bridge this gap, i. e. provide a theoretically-sound approach to inform learning and education in complex media-facilitated settings based on different empirical studies.

Until recently, the concept and the term *Bildung* has rarely been used in the Anglo-American culture. Yet, as Hansen (2008) points out, a discourse between German *Didaktik* and Anglo-American curriculum research has emerged over the last years. Following this line of research, this paper attempts to expand this dialogue to cover recent developments in educational technology and Open Education. The apparent relationship between Open Education and *Bildung* definitely warrants more attention and research (Deimann 2013a).

In this paper, current transformations in the educational sector, that are often summarised under the umbrella term «unbundling» will be presented. These disruptive processes are mostly triggered by the proliferation of open source software and the principles of open science (open access), and have contributed to the Open Education movement with its latest developments of Open Educational Resources (OER) and Massive Open Online Courses (MOOCs). Since OER and MOOCs, in particular, have advanced so quickly it is important to step back and reflect on their impact on education. Therefore, in a second step, *Bildung*, as a powerful theoretical tool will be introduced and it will be outlined how it can impact Open Education. The third part of the paper will develop the argument that even with a profound theoretical underpinning, Open Education is in risk of failing unless the overall educational paradigm remains unchanged. For centuries, education has relied on the intellectual culture of the Enlightenment and the economical paradigm of industrialization. A shift towards a culture of sharing and understanding the capabilities of the community is necessary in order to consequently unfold the capabilities of Open Education

Introduction: The great unbundling of higher education

This introductory section describes some of the main arguments that are used to construct the powerful narrative «The great unbundling of higher education» that is a focal point in educational debates (Pathak and Pathak 2010). Its main purpose is to provide a solution for critical problems in the educational system (explosion of student fees and tuitions, outdated teaching methods) which have led to false promises: «Going to a top university and living as part of a cloistered elite (are) no longer seen as sufficient in an increasingly multicultural and global economic environment» (Brown, Lauder, and Ashton 2011, 25).

Generally, a narrative can be compared to the concept of the «meme» (Dawkins 1978), or, in other words, a reproducible idea in the form of a basic unit of cultural transmission. A meme is an information pattern which is capable of being copied to another individual's memory and can contain anything that can be remembered and learned (e.g. a joke).
With regard to the unbundling meme, a typical example is provided by Anya Kamenetz (2010) in her book *Eudpunks, Edupreneurs, and the Coming Transformation of Higher Education*:

> Here's what I know for sure: The promise of free or marginal-cost open-source content, techno-hybridization, unbundling of educational functions, and learner-centered educational experiences and paths is too powerful to ignore. These changes are inevitable. They are happening now. Innovative private colleges like Southern New Hampshire and for-profits like Grand Canyon, upstarts like BYU-Idaho and Western Governor University, and the community colleges like Foothill-De Anza represent the future. (130)

As Kamenetz insinuates, the unbundling framework provides a heuristic technique originated in economics to sense the historical process of grand transformations that affect the higher education system. Traditionally higher education has been defined as a packaged bundle of content, services, and experiences that led to education with inherent and transferable value to the learner (Staton, forthcoming). As has occurred in the music and newspaper industry, the package is now beginning to disaggregate. Shirky describes the changes in the music industry after the invention of MP3 format (2012) as follows:

> The people in the music industry weren't stupid, of course. They had access to the same Internet the rest of us did. They just couldn't imagine—and I mean this in the most ordinarily descriptive way possible—could not imagine that the old way of doing things might fail. Yet things did fail, in large part because, after Napster, the industry's insistence that digital distribution be as expensive and inconvenient as a trip to the record store suddenly struck millions of people as a completely terrible idea.

Education, as Anderson and McGreal (2012) note «has been relatively immune from such disruptive technologies perhaps because of the high cost of entrance (building campuses), the support and loyalty of alumni, government funders and the conservatism and anti-commercial culture of many academics and academic leaders» (380). However, the specific nature of education and distance education, in particular, can be described as a «complicated set of service provision, with

many complementary and sometimes integrated services» (ibid.). Nevertheless, a process of unbundling educational services has begun which includes (1) content authoring and production, (2) content delivery, monitoring, assessment and remediation, and (3) content sequencing and pathways. While this has been a rather conceptual description without much empirical evidence, in the fall of 2011 Stanford Engineering professors offered three of the school's most popular computer science courses for free online as Massive Open Online Courses (Machine Learning, Introduction to Artificial Intelligence, and Introduction to Databases). The Introduction to Artificial Intelligence course offered free and online to students worldwide from October 10th to December 18th 2011 was the biggest surprise. Taught by Sebastian Thrun and Peter Norvig, this course really was massive, attracting 160,000 students from over 190 countries. This course has received a huge amount of mainstream media coverage and two for-profit companies (with the help of venture capital) were launched (Coursera and Udacity). Advocates for the «new» open online course experiences like Daphne Koller proclaim their solutions in a way that bears a striking resemblance to the notion of «solutionsim» (Morozov 2013), i. e. «recasting all complex social situations either as neatly defined problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized – if only the right algorithms are in place» (5). In her famous TED talk «What we're learning from online education»,[1] Koller argues that, «mastery is easy to achieve using a computer because a computer doesn't get tired of showing you the same video five times and it doesn't even get tired of grading the same work multiple times … and even personalization is something that we're starting to see the beginnings of, whether it's via the personalized trajectory through the curriculum or some of the personalized feedback that we've shown you.» A major driver for this kind of technological innovation is data-driven personalised learning like the New York based company Knewton has developed as a platform to personalise educational content. It is based on the idea of adaptive learning, i. e. a computer constantly assesses a learner's behaviour and thinking habits and attempts to automatically tailor material (content, tests) for him or her. Advocates of adaptive learning lay claim to cost savings (computers vs. personal teachers) and to overcoming the «factory model of education» that has dominated Western education for two centuries. However, critics argue that it is actually this data-driven learning and not the «outdated» teaching model that threatens to turn schools into factories (Fletcher 2013).

Looking closer to these recent developments, it seems that history is repeating itself and so again, it is claimed that technology can improve education simply by the fact that it is technology. Similarly, in the 1980s it has been argued that computers could replace personal tutors that were praised for «one-to-one-

[1] http://www.youtube.com/watch?v=U6FvJ6jMGHU

tutoring.» However, so called Intelligent Tutoring Systems failed to produce comparable results (Spector 2001).
However, it is not only the unwillingness to learn the lessons from the history of educational technology that should be addressed by critics. What is also deplorable is that the overall hype involving MOOCS neglects the underlying paradigm of Open Education. There is the narrative that MOOCs were the invention of Thrun, Norvig and other related scholars[2] that ignores the fact that MOOCs have a much longer history. Moreover, it also excludes the underlying specific notion of openness for which Peters (2009) gives an encompassing overview:

> Openness as a complex code word for a variety of digital trends and movements has emerged as an alternative mode of social production» based on the growing and overlapping complexities of open source, open access, open archiving, open publishing, and open science. Openness in this sense refers to open source models of scientific communication, knowledge distribution, and educational development, although it has a number of deeper registers that refer more widely to government («open government»), society («open society»), economy («open economy») and even psychology (openness as one of the traits of personality theory). The concept and evolving set of practices has profound consequences for education at all levels. (Peters 2009, 203).

The next section specifically addresses the impact that openness has been having on education that resulted in the major movements of open classroom/open schooling, Open Educational Resources, and Massive Open Online Courses.

The Open Education Paradigm

Open Education can be described as the ambiguous effort to provide as much access as possible to education, in particular by removing barriers and increasing participation. Various attempts have been proposed over the last centuries (for a historical overview see Peter and Deimann 2013), however, «its encapsulation in a general philosophy of 'open learning' appears to be a relatively recent development» (Bell and Tight 1993, 2). When it comes to defining Open Education or some of its «relatives» (open classroom, open learning, etc.), there is a shared belief in the importance of flexibility (i. e., organisation of learning and teaching) and individualisation, for instance:

[2] Oddly enough, the German flagship newspaper DIE ZEIT recently named Salman Khan as one of the MOOC inventors (http://www.zeit.de/2013/12/MOOC-Onlinekurse-Universitaeten).

> Open learning is a term used to describe courses flexibly designed to meet individual requirements. It is often applied to provision which tries to remove barriers that prevent attendances at more traditional courses, but it also suggests a learner-centred philosophy. Open-learning courses may be offered in a learning centre of some kind or most of the activity may be carried out away from such a centre (e.g. at home). In nearly every case specially prepared or adapted materials are necessary. (Lewis and Spencer 1986, 9 f.)

This definition is characteristic in highlighting the ambiguity of Open Education as a political reform project, that is the promotion of a concept (openness) that actually belongs to the «genetic code» of the idea of education. Or to put in other words: How can education be possible without opening up the knowledge from an expert teacher and sharing it with fellow students? Bell and Tight (1993) argue, the constitution of «open learning» which is opposed to traditional or «closed learning» is a gross simplification and a myth. Similar to the notion of «democratization, openness has been prevalent in education since the ancient Greeks.3 However, the actual amount of openness which had been practiced in different times over the centuries varied greatly as described in the overview by Peter and Deimann (2013). For the modern era, Open Education reached its peak during the 1960s and 70s in many regions of the world (North-America, Europe) before it sunk more completely into oblivion. The rigorous claims of «Deschooling Society» (Illich 1971) paired with a lack of empirical support for those claims had caused the fall of Open Education. Many years later, the Massachusetts Institute of Technology (MIT) introduced a concept that became one of the central boosters for the revitalisation of Open Education, the OpenCourseWare (OCW) initiative which was a response to the then growing possibilities of the Internet. As reported in the *New York Times:*4

> M.I.T. plans to announce a 10-year initiative, apparently the biggest of its kind, that intends to create public Web sites for almost all of its 2,000 courses and to post materials like lecture notes, problem sets, syllabuses, exams, simulations, even video lectures. Professors' participation will be voluntary, but the university is committing itself to post sites for all its courses, at a cost of up to $100 million.

It is important to highlight the euphoria surrounding the specific context of this time to realize the potential impact of MIT's decision. As Carson (2009, 23) notes,

[3] This is insofar related to the discussions on Lifelong Learning (LLL) as it is also a response to a situation that is perceived as unsatisfactory («education fails to prepare students to the requirements of the highly completive, global economy») which then leads to the tautological claim that learning has to be expanded over the entire lifetime.

[4] http://www.nytimes.com/2001/04/04/us/auditing-classes-at-mit-on-the-web-and-free.html?src=pm

«The idea that a great many top universities might choose to share the core academic materials from their courses – including syllabi, lecture notes, assignments and examinations – on the Web, that they would license these materials in an open source model and encourage others to download and modify them, was antithetical to the thinking of most universities at the time.» Clearly, it was MIT's extraordinary financial status that enabled this step, although OCW received initial funding of $11 million from the Andrew W. Mellon Foundation and the William and Flora Hewlett Foundations.[5] Moreover, the launch of MIT's OCW was not only driven by philanthropic reasons but also by strategic considerations, namely to increase the institute's reach and expand MIT education world wide (Carson 2009). The adoption of OCW materials begun at a rather low speed but increased when strategic partnerships such as with the Chinese Ministry of Education, were established. As of April 2013, there is material available from 2150 courses available on the MIT OCW site.[6]

With the benefit of hindsight, offering all course materials freely to the general public opened the door for the «digital rebirth» of Open Education. It can be considered a brave decision because it was opposed by the mainstream, with so many institutions desperately looking for ways to capitalize on the growing boom of «Virtual Universities», i. e. through a «quick and dirty» transformation of existing courses to digital modules. Often virtual programs were of low quality so that learners skipped these courses and refused to pay. MIT took a different route by offering all of its courses without charging any fee. In his book *Unlocking the Gate: How and why leading Universities are Opening up Access to their Courses*, Walsh (2011) identifies the following divergent trends in access to higher education. First and foremost, there has been a steady trend in rising costs for higher education, in particular at the so called Ivy-League. As a major indication, tuition has increased much faster than the rate of inflation. In addition to that, demand for higher education – Walsh (2011) makes only the case for the US – is at a very high level and outstrips supply. Against this background, it is important to emphasize that MIT's decision to give all its course materials away for free is more philanthropic than educational because «At the same time, by offering course content – but not the university credit that has typically accompanied it – to nonmatriculated students, these elite institutions maintain a key barrier to entry that keeps their exclusivity intact» (11).

In 2006, the Open University UK decided to follow MIT's footsteps and launched the OpenLearn project, which is not only intended to openly publish all the content

5 http://cshe.berkeley.edu/research/ebusiness/casestudies/mitocw.htm

6 http://ocw.mit.edu/about/

that has been produced at the OUUK, but also to openly collaborate with other Higher Education Institutions. OER, according to Lane (2010), are perceived as being a logical match to the OUUK's mission (open to place, methods, and ideas). Along with the growth and diversification of open materials, there has been a differentiation of the term «open.» As shown below in Figure 1, openness is now defined much more technically and less ideologically when compared to the 1960s and 1970s and now includes issues of access, modification, and production.

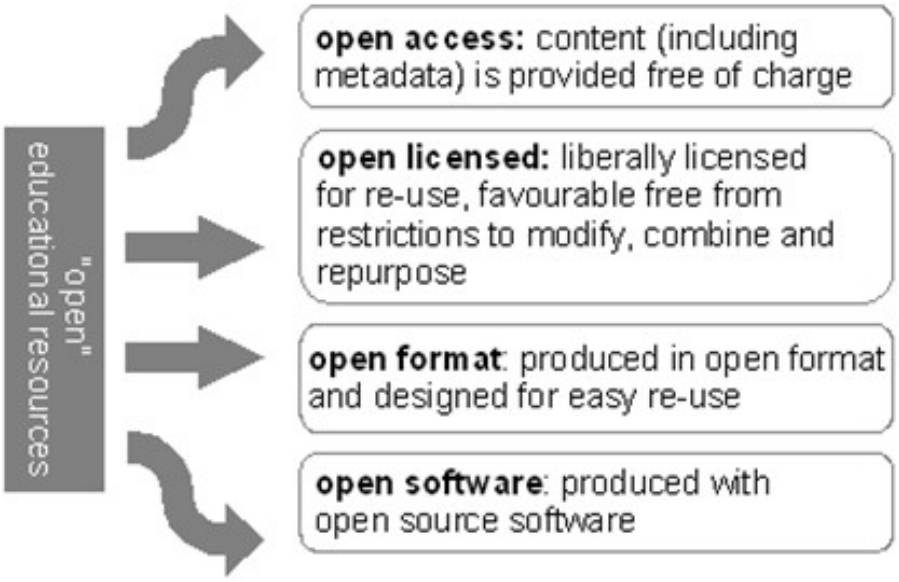

Figure 1: Various meanings of openness (Lane 2009, 4).

Moreover, the close connection of OER and open source software reflects a deeper relationship, namely with the intellectual commons, which is according to Friedman (2005) a «flattener of the world», i. e. a force contributing to a «level field play». With regard to OER, this field can be described as the provision of free materials which are not only produced by elite institutions but also by a myriad of individuals (teachers, learners, trainers) using portals such as MERLOT (www.merlot.org) to reduce social and economic inequalities around the globe.

Open Education in its earlier phase (1960s and 1970s) primarily relied on an instrumentalist perspective of technology (Hamilton and Friesen 2013), i. e. technology was considered as subordinated to education and thus a mere vehicle to realise predetermined educational goals, for example, liberate the learner from oppression. However, OER, and especially Massive Open Online Courses, have produced an essentialist perspective that assumes technology is independent of education and «will lead to the realization of an associated human potential once the technology is in place» (4).

The process of «opening up the gates» – which begun in 2001 with the launch of MIT OCW – to offer education for everybody (given that s/he has access to the Internet) is ambiguous and challenging to judge. Walsh (2011, 22) offers an explanation:

> Universities' willingness to share their course content, traditionally reserved for only a limited number of students, represents a laudable contribution to society. Through online courseware projects, some of the most selective institutions have exposed their intellectual capital in an unprecedented way. But – often with good reasons – they have done so while protecting the substantial part of their value proposition derived from their residential experience, interactions between students and faculty, and, of course, their prestigious degrees. In other words, these institutions have struck a careful balance between altruism and self-interest.

The rediscovery of the masses: Massive Open Online Courses

Massive open online courses (MOOCs) emerged approximately five years ago with the release of «Connectivism and Connective Knowledge (CCK08)» offered by the University of Manitoba. In this course, 25 learners from the University were joined by 2200 learners worldwide. This first MOOC intended to provide a different type of learning experience due to its atypical construction (no registration, no learning objects, no assignments and no assessment and evaluation). Learners were expected to share their ideas on blogs, Twitter or other social network tools, thus utilizing the Internet as an open cultural space. This is also reflected in the non-formalistic approach as outlined in the MOOC #change11:

> This is an unusual course. It does not consist of a body of content you are supposed to remember. Rather, the learning in the course results from the activities you undertake, and will be different for each person. This type of course is called a 'connectivist' course and is based on four major types of activity:
> 1. Aggregate
> We will give you access to a wide variety of things to read, watch or play with. There will be a LOT of content associated with this course, everything from relatively basic instruction to arguments and discussions to high-level interviews with experts in the field. You are NOT expected to read and watch everything. Even we, the facilitators, cannot do that. Instead, what you should do is PICK AND CHOOSE content that looks interesting to you and is appropriate for you. If it looks too complicated, don't read it. If it looks boring, move on to the next item.

> 2. Remix
> Once you've read or watched or listened to some content, your next step is to keep track of that somewhere. How you do this will be up to you. You can keep a document on your own computer listing all the things you've accessed. Or, better yet, you can keep a record online somewhere. That way you will be able to share your content with other people.
> 3. Repurpose
> We don't want you simply to repeat what other people have said. We want you to create something of your own. This is probably the hardest part of the process. Remember that you are not starting from scratch. Nobody ever creates something from nothing. That's why we call this section 'repurpose' instead of 'create'. We want to emphasize that you are working with materials, that you are not starting from scratch.
> 4. Feed Forward
> We want you to share your work with other people in the course, and with the world at large. Now to be clear: you don't have to share. You can work completely in private, not showing anything to anybody. Sharing is and will always be YOUR CHOICE. (http://change.mooc.ca/how.htm)

Initially, there was a lot of enthusiasm about such open formats (Stacey 2013), but this later gave rise to some disenchantment because of the abundance of material and infrastructure. As Weller (2011) points out, education and pedagogy shift from the economics of scarcity, in which there are relatively few experts to whom learners have access via physical interaction (e.g. lecture), making the best from the limited resources (experts and materials such as textbooks) to a model of abundance in which expertise is still rare. However, access to resources is now virtually unlimited, thanks to open access journals, slide, podcasts, videos and so forth. Yet it would be short-sighted to assume that simply having unrestricted, scalable digital materials generates a new form of pedagogy per se. Instead as has been argued elsewhere (Deimann 2013b), (radical) openness may lead to a new form of social exclusion, that is, those learners who would not want to open up their materials and share their ideas with others. This is also indicated in the aforementioned MOOC principles because they impose moral values to learners (sharing, openness) albeit with the «opt-out clause» («you don't have to share»). Moreover, any instructional assistance for learners to help them master the challenges of openness and abundance are neglected, which would be especially important for novices (Brennan 2013). Not surprisingly, research has revealed an «expertise divide» (Mackness, Mak, and Williams 2010) that is not atypical for online learning, but in case of MOOCs becomes more problematic given the outstanding importance of openness and unstructuredness. In contrast to a «closed» e-learning

environment, learning in a MOOC is based on the assumption of already existing skills and not designed to compensate missing digital competencies.

Meanwhile, MOOCs have become both a medium of mass instruction and a philosophy of instruction with roots going back to the earlier Open Education movement. Boven (2013) provides an account of the historical antecedents of the MOOC movement that identifies interesting parallels, such as the «studia» (Studium generale) in medieval Europe. The studia did not have formal and central administration controlling admission, matriculation, and commencement. Instead, masters with a reputation as scholars and teachers attempted to attract students from local communities («studia particulare») and from across Europe («studia generale»). Although not massive in terms of today's understanding and also not in scale due to technological limitations, these early learning forms entail core educational values of MOOCs, namely the non-hierarchical exchange of ideas between teacher and learner on an individual autonomous level and the belief in the power to be guided by a master through the seven liberal arts. In a similar vein, Peter and Deimann (2013) reconstruct the role of openness for education by reviewing major trends over such as student driven education, open teaching and self-education, and the right access to knowledge. In their conclusion it is emphasized that, throughout the centuries there has been a strong connection between socio-technological improvements and increased opportunities for teaching and learning. This pertains not only to institutional settings but also to self-organized forms. Today this is reflected in virtual learning spaces such as Peer-To-Peer-University or Open Study, which offer free courses and an open platform for international study groups. However, a similar strong alliance between students and teachers that had occurred during the Late Middle Ages has not yet emerged. There is a rather loose connection in the Massive Open Online Courses given the very low formal structure. On the other side, iTunesU can be regarded as a digital resemblance of the historic practice of inviting scholars/lecturers to a group of students. (12)

In his review of previous educational innovations, Boven (2013) comes to the conclusion that after an initial euphoria triggered by an increased availability of higher education, innovations were «co-opted by and absorbed into the existing educational structures of the day» (3). Established institutions often perceived innovations as a threat to their very existence and thus they begun to strategise how to incorporate them into the current praxis. In many cases (e.g. the University without Walls movement in the 1960s and 1970s), the existing system simply took the new players as they were (assimilation) without succumbing to the predicted earth-shattering changes. In doing so, they forfeited the chance to accommodate the trends, i. e. altering rules and practices to better fit the purposes of the emerging changes.

With the most recent developments of MOOCs, especially with the fiercely attempts to capitalize on bringing education to the masses and the transformation to «open courses,» the process of commodification seems to be replicated. As Ogrizek (2013) argues in her recent blog posting,

> The corporate world has other tentacles in education and the portal that's granting them the most access these days is technology. The current «realism» being foisted on academics is the idea that online distance-learning, in the form of massive online open courses (MOOCs), must be implemented to save cash-strapped institutions. The idea is being flogged by corporations looking to expand their markets and has found support among co-opted academics willing to help them.

The commercialization and commodification of education that has emerged recently is surely catalysed by large MOOCs offered on for-profit platforms but there is also a growing regulation from legislation that further fuels the debate. For instance, the state of California has approved Senate Bill 520 that mandates open online courses be approved for college and high school credit. This means that students who cannot access regular, campus-based courses (so called bottleneck courses) are allowed to take a MOOC to receive academic credit. SB 520 identifies 20 MOOCs as eligible, most of which are offered by Coursera (De Vivo 2013). Commercial MOOCs, endorsed by politics, are a classical example of a public-private partnership in which «the government guides policy and provides financing while the private sector delivers education services to students. In particular, governments contract out private providers to supply a specified service of a defined quantity and quality at an agreed price for a specific period of time» (Patrinos, Barrera-Osorio, and Guaqueta 2009, 1). This alleged «win-win-situation» has not yet lived up to expectations. As reported by Kolowich (2013), a credit-bearing MOOC offered at Colorado State University has not yet attracted any learners, despite a saving from $ 961. Furthermore, the philosophy department at San Jose State University issued severe concerns against the utilization of the MOOC JusticeX, developed by celebrated Harvard professor Michael Sandel:

> Should one-size-fits-all vendor-designed blended courses become the norm, we fear two classes of universities will be created: one, well-funded colleges and universities in which privileged students get their own real professor; the other, financially stressed private and public universities in which students watch a bunch of video-taped lectures. (http://s3.documentcloud.org/documents/695245/san-jose-state-u-open-letter.txt)

Altogether, the trajectory of MOOCs departs more and more from its idealistic origin that was based on the notion of connectivism, i. e. focusing on learners' networks and personal learning environments, openness, and the associated principles around remixing and sharing (Kop, Fournier, and Mak 2011). It is thus warranted, in order to strengthen this position to have a more theoretically-sound foundation. As other writers (e.g. Bell 2011) have pointed out connectivism clearly helps to support practitioners by proposing a set of guidelines to utilize the Internet as an open cultural space. On the other side connectivism «alone is insufficient as a theory to inform learning and its technology-enabled support in an internetworked world» (Bell 2011, 98). It is the purpose of the next section to outline a more fruitful theoretical approach to better understand the distinct process of participating in a MOOC.

The Theory of *Bildung* and its potential for Open Education

Bildung is a valuable theoretical lens to analyse the concepts of OER and MOOCs because of its ability to outline those mechanisms that occur to the learner in open digital environments. In contrast to classical learning theories, which are centered around the acquisition of knowledge and skills in predefined, formal settings, *Bildung* aims at capturing transformative processes such as subject-object transformations (Schneider 2012) or the move beyond the present state of affairs (Peukert 2003).

Classical writings on *Bildung* are characterized by in-depth and profound analysis of internal processes based on grand philosophical concepts such as freedom, reason, individuality, and authenticity. In addition to that, *Bildung* has often been characterized by antithetical pairs such as state vs. event, normative vs. non-normative, reflexive vs. transitive, and occurrence vs. action (Schneider 2012). Moreover, *Bildung* is conceived of as an instrument to mediate or alleviate influences from the society on the individual that are – as illustrated in the novel Emile by Rousseau – prone to undermine the individuality of the person. Many advocates of the early Open Education movement shared an understanding that was directly inspired by the thinking of Rousseau, for example, the rejection of architectural and temporal limitations in the classroom and the belief in a laissez-faire type of education.

Within the shift from Open Education to OER, there was also a shift from a naïve compliance with the philosophy of Rousseau to more pragmatic conceptions. However, the complex nature of OER (see e.g. Peters 2008) warrants a thorough theoretical account that ensures its prosperity and reliability.

Given this specific understanding, OER can be understood as a «perfect fit» for the task of *Bildung* inasmuch as they provide a formalized approach – Open Access, «4R principles» (Wiley 2009) – to be utilized by the user. Moreover, OER facilitates

unrestricted access to virtually any digital content that has been produced as such, in contrast to copyright protected materials that require financial fees and limit the freedom of the user, OER allows a self-directed usage of materials (free to remix, repurpose, and redistribute). This comes close to the spirit of Humboldt with a strong emphasis on the unrestricted interplay between the world and the self. Therefore, Deimann (2013a) has coined the expression «kindred spirits» to account for the conceptual overlapping between Open Education and *Bildung*:

> One could say that *Bildung* could be seen as being supported by OER to achieve its goals of characteristics such as self-determination, maturity, and autonomy. One could also say that OER can offer much support for the positive social and personal vision of *Bildung*. And as a result of individual (and also collective) progress toward these goals, existing resources could be developed and refined, and new resources created – in a relationship of reciprocal interaction and benefit that might even be reminiscent of idealist notions of dialectical development. This process could also be seen as a realization of Humboldt's metaphor of strengthening all our inner powers into one force which then requires that the individual engages with a broad spectrum of topics to gain an in-depth picture of the world. (193)

In addition to this general reconstruction of Open Education with the help of *Bildung*, the following theses attempts to outline in more detail how the two concepts can benefit from each other.

Learning to utilize OER will emerge as a global need that is paradigmatic for the digital age.

Looking back at the history of education, there have been several major connections between the need of a class of population with specific educational practices, such as Christian education in the Middle Ages or vocational training for the blue- and white-collar workers. There is evidence that the values associated with OER – sharing, openness – will become as influential as their ancestors in the Industrial Age – mass production, division of labour – thus shaping a new educational practice based on sharing and collaboration (Grassmuck 2012; Jarvis 2011). Yet, it is too early for more concrete manifestations. However, the «OER university» might be a significant example for the various attempts around the globe to capitalize on the power of open content and open collaboration:

> The Open Educational Resource (OER) University is a virtual collaboration of like-minded institutions committed to creating flexible pathways for

> OER learners to gain formal academic credit. The OER University aims to provide free learning to all students worldwide using OER learning materials with pathways to gain credible qualifications from recognized education institutions. It is rooted in the community service and outreach mission to develop a parallel learning universe to augment and add value to traditional delivery systems in post-secondary education. Through the community service mission of participating institutions we will open pathways for OER learners to earn formal academic credit and pay reduced fees for assessment and credit.[7]

However, it is important to supplement OER with pedagogical concepts that share the same humanistic belief and spirit. Traditional learning theories are too narrow as they assume fixed, predefined contexts and focused mostly on cognitive processing. In contrast to that, *Bildung* is a much more broader approach that accounts not only for personal variables but also for the importance of culture and history that shape the situation in which learning occurs.

The focus on Open Access and OER is important because it is likely to overcome predicaments faced by most of the classical attempts in educating the masses (Weller 2011), i. e. education was often regulated by the ability to master a certain language (Latin, Greek). This, however, excluded many people and foiled the humanistic claims. Nevertheless, it should be noted that the Open Education movement contains a tendency of exclusion, namely, all the persons unwilling to obey the «rules of openness.» Openness in this sense can be understood as a device embedded in power relations that shapes the actions of people (Foucault 1977). On the other hand, Open Education is apt to bridge the gap between the theoretical and philosophical ideal, in particular the (neo-)humanistic, and the practical realization. This was apparent throughout history in dichotomies between intelligentsia and laymen, and between the idealization of ancient culture and the actual living environment («Lebenswelt»[8]) of ordinary people. A continuing integration and adoption of OER and Open Access policies can be theorized by focusing not only on the individual as the sole target of *Bildung* but also on communities. There have been similar attempts in the history of adult education, such as the Volks*Bildung* (education of the nation) in the early 20th century, which were later completely destroyed by the Nazi regime.

OER have emerged as a disruptive force that challenges, among other things, an orchestrated political approach. This is apparent, for example, in the ongoing reluctance of German educational policy to formulate a coherent OER strategy that is in contrast to previous attempts for capitalizing on the power of technology

7 http://wikieducator.org/OER_university/Home

8 This concept has been made famous in the writings of Habermas (1981).

(e.g. «Schulen ans Netz»[9], «Neue Medien in der *Bildung*»). OER has not been an issue on the national level nor on the level of the federal states. Moreover, OER may leverage a re-empowerment of the user. In contrast to the late 1990s and early 21st centurys, the perception of the all-encompassing power of technology has shifted from a dystopic view that tends to abandon the ideal of *Bildung* in light of the omnipresence of technology (e.g. Sesink 1998), towards a perspective that is based on affordances of technology such as the amount of control by the user, which is much more fundamental than ever before. Indeed there have been a lot of learner freedom in technology-enhanced learning, especially in the sub-discipline Distance Education (Moore and Kearsley 1996) but never before has there been a chance to alter the legal constraints of learning and teaching materials. As has been a core part of the upheaval of OER, liberal licenses (e.g. Creative Commons) offer amounts of freedom that extend beyond traditional offerings («cost free»). In a similar vein, connectivism (Siemens 2005) – developed to reflect more details about the transformations of digital technologies and its impact on learning and teaching – emphasizes the importance of digital tools such as RSS feeds, virtual classrooms, instant messaging or Yahoo Pipe to establish collaboration with peers all around the world at an unprecedented speed. In this process, knowledge is assumed to be actively constructed, rather than transmitted from the teacher to the learner.

Summary and Conclusion

This paper attempts to introduce the importance of openness in education as it has emerged in the broader paradigm of Open Education and related, technology-driven forms of OER and MOOCs. It was argued that current processes of unbundling and disruption shake up higher education based on sophisticated technological innovations. Whereas social media systems like Facebook or Twitter have been used increasingly for the last five years, it was only in 2012 when Massive Open Online Courses reached the mainstream. Since then, a heated debate with issues regarding accreditation, certification and quality control has begun, challenging institutionalized higher education («The end of the University as we know it»). The narrative that is used to argue in favour of (commercial) MOOCs follows the «education is broken» logic[9] . Nevertheless, the hasty implementation of MOOCs has led to some complications that were not initially anticipated (e.g. faculty members resolutely refuse to teach foreign MOOCs).

There is a similarity with the previous Open Education movement which had its peak in the 1960s and 1970s because it also claimed the educational system to be outdated and broken. Opening up was the formula to «free» learners from

[9] This concept has been made famous in the writings of Habermas (1981).

the burdens of fixed curricular and spatial order. However, there was no coherent empirical evidence whether openness actually contributes to better learning.
A common theme of Open Education throughout its development refers to a highly pragmatic approach to the detriment of a solid theoretical foundation. Therefore, the idea of *Bildung* has been suggested as a productive attempt to substantiate Open Education, as has been discussed along several strands within the current MOOC debate. It is hoped that *Bildung* will benefit from this integrated perspective in such a way as traditional concepts and assumptions are re-analyzed and re-evaluated against the claims of Open Education.

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Media Form School – A Plea for Expanded Action Orientations and Reflective Perspectives

Theo Hug

Abstract

Media-related rhetoric plays a remarkable role in the context of school (re)forms, whether the arguments are euphoric or skeptical about media. On the one hand, there are reminders of the need for sheltered spaces and developmental tasks for children and adolescents, for the detailed differentiation of literacy as an educational task, or for maximizing equal opportunities. In these cases, media are mostly seen as means of learning, education or development advancement. On the other hand, debates also deal with the development of adequate infrastructures for learning and teaching with more-or-less «new» media, media-based school development projects, or the implementation of e-learning strategies. Here it is striking that, on closer observation, innovative efforts frequently turn out to be structural-conservative administrative measures which fail to address the contemporary media-anthropological, media-epistemological and media-cultural challenges. The focus of the article is on school-based monopolies of education and information. It explores expanded perspectives of reflection and action-orientation in light of the theory of medial forms.

Introduction[1]

That media (could) play an increased role in the context of school teaching and learning is lamented by some, hoped for by others, and occasionally ignored. That media are generally significant in the processes of growing up, developing identity and value-orientations, and in everyday aesthetics, and in the forming of self- and world-references (*Selbst- und Weltbezüge*) is also commonly affirmed. To put it briefly and abstractly: It is nowadays beyond question *that* media are involved in some respects in creating realities and shaping communication processes. In this general sense they are definitely granted constructive traits, even and especially when the medial influences and effects are assessed to be problematic or destructive (see Hug 2011a). However, when it comes to describing what constitutes this significance, how it comes about, and how it is to be evaluated, opinions differ widely.

One difficulty in this is that both education and media studies use many different definitions and notions of media, making intra- and interdisciplinary communication

[1] Translated by Mag. Susanne Toelken-Mettauer.

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a challenge. Similarly, terms like ‹school›, ‹learning› or ‹education› are used in very diverse ways, and they correspond with partly incommensurable forms of theoretical conceptualization and practical application.

In addition, everyday uses may touch upon scientific discourses in the sense that everyone –including academics– has their own background in terms of upbringing, schooling, media use, (gaps in) learning, etc., in general without systematically and consistently (self-)reflexively inquiring about the relevance of these experiential contexts for institutionalized research processes. By this I do not mean that every articulated context of experience should withstand a conceptual analysis based on the philosophy of education, media or language, or even have been subject to psychoanalysis. Neither levels of conceptual accuracy nor degrees of psycho- or socio-dynamic clarification represent values as such. Correspondent demands for clarification make different sense in different contexts. Also, values that have been found to be important in one context cannot be meaningfully defined once and for all. However, they can be justified based on situation and context by the actors involved, and made valuable depending on skill, scope of action, and the given constellation of actors and powers.

In both everyday and scientific discursive contexts, we find media-phobic and media-philic points of view but also others that matter-of-factly deliberate and differentiate. I believe it is important not to lose sight of the affect-logical[2] dynamics in this connection (see Ciompi 1997), especially since it is easy to notice recurrent patterns of argumentation in the wake of historical and contemporary media dynamics (see Rusch 2007, 44; Leschke 2013). One of the challenges lies in the development of individual, institutional or meta-theoretically oriented forms of self-reflection, both in regard to affect-logical dimensions of media issues but also as an element of pedagogical professionalism (see Hierdeis 2009) under current conditions of medialization.

Another challenge consists in overcoming (self-)restrictive perspectives when it comes to media and school. In the following, two examples will serve to illustrate how discursive constraints in school pedagogy and the technology of teaching can/could be resolved. After some initial considerations, the examples of concrete poetry and media activism are used to question the matter-of-fact handling of linguistic and action-oriented forms. In conceptual terms, it will be shown how the theory of medial forms (Leschke 2010) is relevant for discourses of educational and learning theory.

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[2] For a brief explanation of the concept of ‹affect-logic› see Ciompi (n. d.). The concept was introduced in the early 80s. It refers to interactive dynamics between feeling and thinking or emotion and cognition in a sense that affective elements show up in all cognitive processes («logic» in a broad sense) and elements of logic show in all emotional dynamics or affects.

1. Initial considerations

For several years, media issues have increasingly found their way into school-related discourses of learning, education and organizational development. In many countries experts are working on developing positions and recommendations for action related to current questions of media and education policy.[3] Yet this does not mean that testimonies to the relevance of media and technological promises made in the context of education policy would go hand in hand with the prominent ranking of media-theoretical or media-pedagogical topics in grant programs or legal structural requirements. Concerning the situation in Austria, though there is no lack of rhetorical appeals to innovation (consider the slogans ‹NEW educator training› and ‹NEW teacher training›), the relevant expert reports are all written in line with traditional views (see Härtel et al. 2010; Schnider et al. 2011). A supplementary expert report on the ‹NEW teacher training› (see Hopmann et al. 2010) may criticize this tradition in Austrian school teaching, «the assignment to fields of work is even today mostly based on organizational principles that essentially established themselves nationwide in the eighteenth and nineteenth centuries» (ibid., 4). However, when this same report discusses the transition from a «premodern matrix system to a modern, flexible school design» (ibid., 4), it does not explicitly take into account the role of media.

By and large, affirmations of the relevance of media in educational policy discourse correspond to consistently marginal positionings of media-related concerns. That questions about the order of the world, of knowledge, the societies, generations, sexes, etc. are always related to questions about the order of media often does not receive sufficient attention. The idea that media pedagogy is among the eligible «suitable areas of concentration» (Härtel et al. 2010, 48) for teacher training does not speak of an adequate understanding of the current requirements, just like the marginal reference to the use of «real and virtual places of learning» (ibid., 7) inside and outside of school or occasional links to ICT (ibid., 11, 19).

While in these reports, media issues are treated as optional pedagogical specializations, structural measures further contribute to the view that the occupation with digital media and new cultures of learning in school is largely optional. Even if the basic ordinances by the Ministry of Education, Art and Culture concerning «Holistic-creative learning culture in schools» and «Media education» (see bm:ukk 2009; bm:ukk 2012) contain important suggestions for reflection and organization, it remains up to the teachers and administrators to seize them.

Austria is relatively hesitant to pick up international initiatives which are dedicated to opening up education on different levels by using digital communication

[3] For the German-speaking countries, consider the initiatives «No Education without Media» («Keine Bildung ohne Medien»; http://www.keine-bildung-ohne-medien.de/), «Media Education NOW» («Medienbildung JETZT!»; http://www.medienbildungjetzt.at/) and «eEducation» (http://www.eeducation.at/).

technologies, creative commons licenses and massive open online courses (moocs). For a few years, the labels Open Education (OE) and Open Educational Resources (OER) have been used for discussing developments in digital media (see for example Atkins 2007; Butcher et al. 2011).[4] The reports mentioned do not contain these discourses, just as contemporary handbooks and encyclopedias on pedagogy and education also do not (see for instance McCulloch and Crook 2008; Tippelt and Schmidt 2010; Horn et al. 2011). Discourses that are critical of schools (see for example Blankertz 2013) are hardly any different. However, specific initiatives and projects5 reveal that the OER movement has indeed arrived in German-speaking Europe and that forward-looking approaches are being developed. In particular, Michael Kerres and Richard Heinen have demonstrated with the cooperative project called «Edutags» how informationally closed and open ecosystems can be designed for the school-based use of learning resources (see Kerres/Heinen 2014).

Even if it is true that media issues have increasingly been discussed for a number of years in discourses of school pedagogy and the theory of learning and education, these discussions do not, or in some sub-discourses at best, pay attention to several current challenges, including :

- The role played by school, which is frequently, and more or less consistently, connected to specific diagnoses of the times and characterizations borrowed from social theory. In the process, the plurality of such diagnoses is seen as little of an issue as more basic questions about the ways «in which ‹sociology of mobilities› disrupts ‹sociology of the social as society›» (Urry 2000, 4) or considerations *After Society* (*Nach der Gesellschaft;* Faßler 2009).
- Justifications of school types as institutions of society occur on micro-, meso- and macro-levels from different normative and descriptive-analytical perspectives. The theoretical approaches to school elaborate on and critique different tasks and social functions as well as arguments intrinsic to and beyond school structures. The possibility of justifications based on media theory is largely suppressed in these discursive contexts, with some exceptions (see Böhme 2006).
- Discourses of media epistemology and media anthropology follow these same lines. The variety of cultural attitudes in medialized life-worlds and the diverse ways that perceptions and areas of reality can be referenced make it necessary to clarify the modalities of referencing (Schmidt 1999, 134–139). Informational dynamics are changing in view of the dynamics of simultaneously «disappearing»

[4] See http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/.

[5] See for instance http://www.e-teaching.org/community/communityevents/onlinepodium/oer_schule_hochschule, http://www.eduhub.ch/community/special-interest-groups-sig/sig-open-educational-resources/, http://www.edutags.de/ or http://l3t.eu.

and the «omnipresent» digital technologies, and due to questions about the relationship between the reality of experience and the experience of reality. Issues concerning the importance of «informational intelligence» (Faßler 2008), «automatisms» (Bublitz et al. 2010) and post-humanistic and post-anthropocentric approaches (see for example Braidotti 2013) for (media) education in general and school education in particular have so far rarely been taken up in discourses of school pedagogy.

These brief remarks on the initial situation show that, in light of the *mediatic turn* (Friesen and Hug 2009), work is pending on a number of relevant and elementary issues which go far beyond established educational-technological models of e-education, strategies of implementing e-learning in schools, and conventional approaches to standardizing media education in schools.

2. Concrete poetry and media activism as occasions and links for expanded perspectives of school and media pedagogy

There is no shortage of models and scenarios when it comes to the ways that digital media can be applied in contexts of school teaching and learning.[6] As in the use of analog media and all kinds of teaching material, possibilities for thought and action are frequently taken up and explored only in a limited way. This affects, on the one hand, the systems of signs that are used more or less as a matter of course, and, on the other, the discourse on action orientations. Below I would like to clarify this by means of two examples.

2.1 Considerations on the sound-image «Media f/Form School»

The title of this article, «Media Form School», offers various possibilities for interpretation. One way of ‹listening› to it suggests that media form the school, without mentioning *how* this happens. There is a wide range of direct and indirect potential influences that come into question, for example through developments in the entertainment industry and media economy, changes in media law, the effects of media socialization, the evolutionary dynamics of a media society, products of e-learning industries and new business models, innovative media formats and new forms of mobile media culture, the architecture of school buildings, the use of sign systems, changed perceptive modes and economies of attention, the use of medications, bio-political and bio-medial developments, administrative routines, etc. These and other media developments can be regarded as isolated phenomena or as an ensemble or context of interaction, as marginally or vitally relevant, as

[6] See for example Hettinger (2008), the special issue on e-learning in schools («E-Learning in der Schule») of the journal *Zeitschrift für E-Learing* 4(3), http://www.e-learning-zeitschrift.org/03_2009/), or the information provided by the e-learning network eLSA (http://elsa20.schule.at) and the international Network for Mobile Learning Scenarios (see http://scenarios.londonmobilelearning.net/).

theoretically founded or a-theoretical, application-oriented or as intended to be free from purpose, glocal, regional or local, gladly, skeptically or desperately, etc. The particular focus and way of addressing the subject, as well as the degree of differentiation certainly open specific discursive and performative horizons whose meaning is normally not immediately clear. On closer examination, exactly those representations and problem statements which are all too «self-evident» turn out to be questionable.

In most cases, it will be possible to dedicate only a very limited amount of time and energy to the explication of presuppositions, starting points and methodical justifications. If we rate communicative processes highly and forms of strategic assertion or tactical conquest less so, then we should also explicitly spell out, no matter how provisionally, our understanding of the problem(s). For example, if the title of this article is to be illustrated in a chart (see Figure 1), it makes a difference how the interrelationship of these elements are to be understood: As an «interplay», not otherwise specified, of three broadly defined clusters of factors; as an interactive model of certain methods of teaching, media technologies and school types; or as a Venn diagram which should represent, summarily and logically , the specific suitability of tools of a learning platform for certain forms of working and learning in a concrete school. The list of options could easily be continued, but the ones mentioned show sufficiently that established modalities in illustration are no less dependent on context and in need of interpretation than phonetic similarities and differences of forms of linguistic articulation. The algorithmic content of the representation is less obvious. Those familiar with current applications of a commercial software package know that Figure 1 can be generated relatively simply and that the creative latitude of the program used is limited, and so they can easily reconstruct forms, choice of font and colors as well as layout of the individual parts of the diagram.[7]

At this point, I want to go one step further and bring into play a point of view which has not attracted much interest in school or media pedagogy. The openness of the title's phrasing may invite to pause and produce associations. And if associated areas of tension are depicted as in Figure 2, the resulting reading experience may be similar to Heinz Gappmayr's works of *Konkretedichtung* (concrete poetry), a little known genre. In the course of a reflexive contemplation of the text-image «Media Form School» (Figure 2), prevalent uses of the employed terms are made dynamic insofar as their ontologizing traits are addressed and manifold assignments of characteristics come into consideration. Through their layout, visual and conceptual

7 The argument could certainly be differentiated much further, for instance by means of overviews of visualization methods (see http://www.visual-literacy.org/periodic_table/periodic_table.html), through considerations of diagrammatic presentation (see Bauer and Ernst 2010) or Peter Bexte's project on visual argumentation (see http://www.geisteswissenschaften.fu-berlin.de/v/embodiedinformation/projects/index.html).

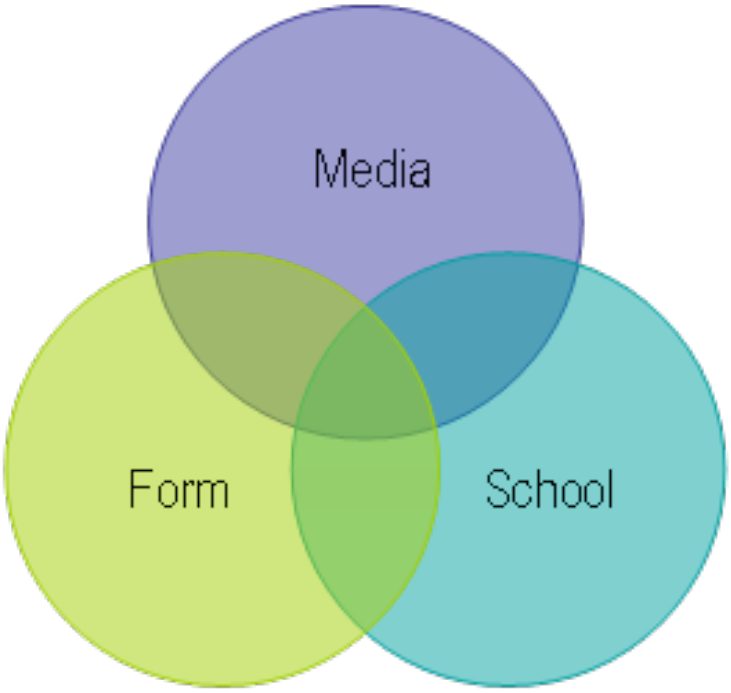

Figure 1: Chart «Media Form School» (illustration by the author).

elements create areas of tension which suggest a clarification of how both (visual and conceptual) levels relate to each other. In this context, attention may be paid to possible uses of concepts, their position in the framework of cultural symbols and societal contexts, rules of composition, connections to established aesthetic forms of representation, forms of figurative transfer, etc. (see Hug 2002, 21–23).

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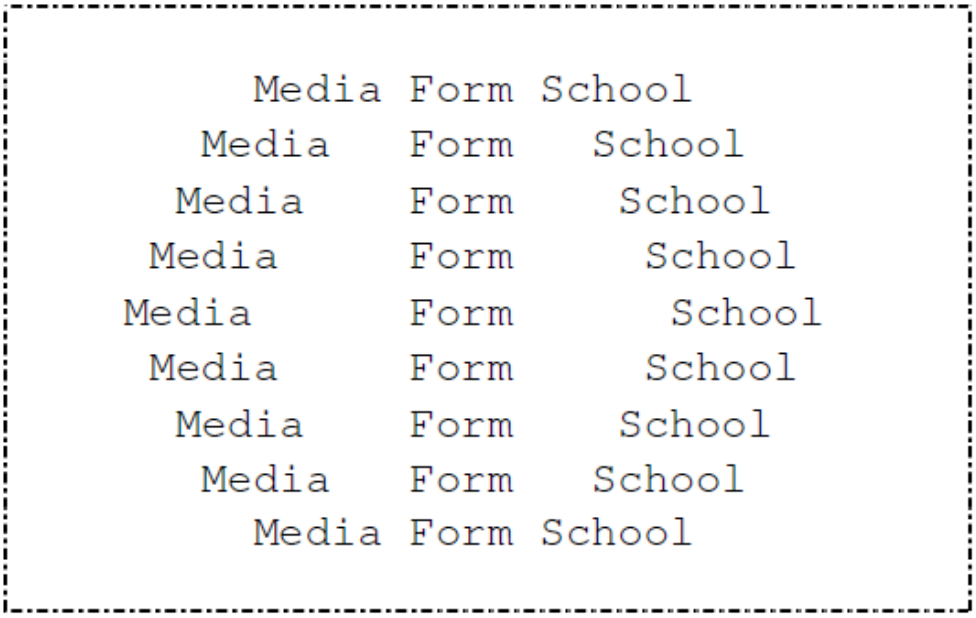

Figure 2: Chart «Media Form School» (illustration by the author).

If we regard Figure 2 as a text-image in the sense of conceptually oriented visual poetry, new interpretations open up. As graphic material, the multiple character strings of «Media Form School» can stage an event in perception, so to speak, which consists in the paradox of presence and absence. Already the spatial proximity of the individual expressions can be interpreted as coexistence, cooperation, conflict, interdependence or entanglement. The reading-image is outwardly and inwardly open, and from self-referential points of view it is of a medial character itself. Thus, the difference between a finite string of characters and open definitions offers diverse interpretations as to relations between idea and visual appearance, as well as regarding conceptual and perceptive processes.

Examples of concrete poetry can be very helpful in disrupting and questioning routine use of language and symbols as a matter of course. By making visible the material appearance of something thought and the transition from sign to idea, categories of thinking take center stage in an elementary way. In this way, formal education and media education are given new perspectives for the critical examination of linguistic and symbolic forms.[8]

[8] Similarly, different forms of rationality can be critiqued following poly-contextural logics. For example, «The Chinese Challenge» team-blog deals with the connection between written form and form of thought, and with the philosophical question: «to what extent the Chinese script may correspond to a specific form of rationality?» (see http://www.thinkartlab.com/CCR/rudys-chinese-challenge.html). Particular aspects of this subject have also been examined from a linguistic point of view (see Boroditsky 2001). For a brief introduction to «poly-contexturality» see Günther (1973).

2.2 Considerations on media activism

«So, does the current media pedagogy have to be so well-behaved all the time?», Ben Bachmair asked recently during a discussion at a conference on «Media – Knowledge – Education: Free educational media and digital archives.»[9] Well, school pedagogy and academic pedagogy in general – not only in German-speaking areas – occasionally have to put up with similar questions. It may not be surprising that different forms of ideology, of the narrow limitation of topics, of benevolent subordination and casual, opportunistic argumentation can be found also and especially among those who want to oblige others to very specific notions of criticism or sell these notions as «the one and only truth.» After all, there are many paradoxes that have figured in pedagogy since the theorization of educational action began. However, this does not help those bright minds who cannot or will not be satisfied with rhetoric about innovation motivated by educational economy, with e-learning as a subsidiary tool of technology-oriented administrative bureaucracy, or with demands of educational policy that neglect the role of media.

Some options for expanded, less «well-behaved» perspectives of thinking and acting between the poles of other-directedness and self-determination present themselves in the wake of media-activist forms of intervention. I have already published some considerations on this (see Hug 2011b), which I want to use here once again and further differentiate.

On the one hand, ‹media activism› can be considered a collective term for the diverse forms of politically or artistically motivated media use for protest and participation aimed at changing society. The different orientations, languages, methods and goals of more recent forms of media activism[10] can each be described in detail. From a historical perspective, media activism can be described in the sense of addressing «media history *as* the history of resistance» (Sützl 2011, 9), regarding both its content as well as it being a «*mode* of media history which makes it possible to understand media activism in its political dimension» (ibid.). From a systematic standpoint, the different forms of media activism can be analyzed as variations in the sense of Goodman und Elgin (1989, 93–113). The concrete manifestations can be examined on the basis of three aspects: (1) unconventional use of media, (2) strengthening of minority developments and (3) cognitive autonomy in resistant subcultures (see Hug 2011b, 3–4).

Sporadically, media-activist efforts are taken up in the context of school. The example of graffiti shows how different such references can be. On the one hand, «graffiti education» refers to a prophylactic or preservative programs aiming at the

[9] «Medien – Wissen – Bildung: Freie Bildungsmedien und Digitale Archive»; see http://medien.uibk.ac.at/mwb2013.

[10] Consider for example culture jamming, hacktivism, alternative media, tactical (bio-)media, electronic civil disobedience, electronic street theatre, swarming, anti-corporate saboteurs, etc.

local or regional prevention of media-activist interventions.[11] On the other hand, there are lesson plans and guidelines for lesson design readily available which emphasize the use of software and the deconstruction of writing (see Schuster 2004) or contributions to the design of the school building (see Deisenhofer 2009). Differentiated socio-critical considerations of graffiti as an informal educational context receive relatively scant attention. Such a broad perspective is what Richard Christen has in mind when he writes: «Although seldom recognized as such, graffiti crews are also educational organizations that promote valuable learning among their members» (Christen 2003, 57). He argues that

> graffiti education both parallels and diverges from the teaching of these traditional institutions, functioning paradoxically as both a status quo and transgressive organization. Graffiti provides poor and disadvantaged adolescents with knowledge, skills, and values important for success in the mainstream. At the same time, it bonds young people to their urban neighborhoods, empowering them to challenge the dominant society and to transform rather than escape their communities. (Christen 2003, 57)

Such a point of view goes far beyond the occupation in the classroom with graffiti as a historical or contemporary art form, as a case of application for software exercises, or as a decoration on specifically designated school walls. Such a point of view invites fundamental reflection on the capacity of different forms of organization, on the legitimation of didactics and learning arrangements, or on the relationship between formal and informal contexts. This can occur in areas of tension, which are linked, for instance, to action orientations in contexts of media activism and school (see Table 1). In view of the fact that creativity, critical thinking, independent problem solving, responsible action, and the competent handling of media are (or should be) taken seriously in many places as interdisciplinary guiding principles of education, these aspects could play a similarly prominent role in both contexts (of media activism and school). In actuality, however, we can discern considerable differences. In the context of learning and teaching in school, creativity, critical thinking, independent problem-solving, etc. are far more oriented to stabilizing and continuing the educational institution and passing on sociocultural programs, and not least the assimilation to these programs and participation in social institutions.

[11] See for example http://www.warnergroup.com.au/graffiti-awareness or http://www.riversideca.gov/graffiti/education.asp.

Destabilization	–	Stabilization
Discontinuity	–	Continuity
Revolution	–	Evolution (reform)
Subversion	–	Transparency
Disobedience	–	Obedience
Self-will	–	Solidarity
Resistance	–	Assimilation
Refusal	–	Participation

Table 1: Action orientation in contexts of media activism and school

In my opinion, these are relative, not absolute opposites. It may be true that the left column in Table 1 tends to be associated primarily with media-activist contexts, and the right column with school. However, such items as self-will, disobedience and refusal may gain weight in the latter context in a way that implies that the viability of conventional arrangements is coming to an end. Conversely, conventional concerns of political participation or a high pressure for assimilation from within the group may also be important in media-activist contexts. Especially when critical notions of pedagogy and (media) didactics are conceived *as* media-activist ones (see Giroux 2001), the differences on an individual basis may become blurry or noticeable only in details. In most cases of action-oriented didactics in school contexts, considering the mentioned areas of tension and using media-activist examples will lead to expanded action orientations and perspectives for reflection.

3. Medial forms – Considerations on the application of media-theoretical differentiations in contexts of school pedagogy

In educational and school pedagogy, forms have always played an important role, even though the concept of ‹form› is hardly ever made explicit.[12] While variations on school types, teaching methods, forms of working or social forms are readily distinguished, discourse on media forms mostly relates to media technologies.

[12] See for example Plato's notion of idea/form (Greek idea, eidos) as that which truly «is», in contrast to sensorily things perceptible and transient things; see also Plato's elitist stage model of limited possibilities of rising to the idea of the good and true in the education state. Finally, see the formal stages of instruction of Johann Friedrich Herbart (1776–1841), or Wolfgang Klafki's distinction between formal, material and categorical theories of education.

In the following, I want to point out how such conceptual differentiations can be reassessed and expanded in the light of contrasting theoretical perspectives.
If discourse on education and upbringing mentions forms in regard to media, it usually does so through unsystematic or illustrative lists of media[13] or with the differentiation between primary, secondary and tertiary media that Harry Pross introduced in the 1970s (see Pross 1972, 10ff.)[14] and that still serves as an essential point of reference, for instance in handbooks (see Kommer and von Gross 2012). Some authors have developed specific, theoretically founded concepts which can be applied to school-pedagogical contexts. Bachmair for example uses perspectives from life-world, socialization and semiotic theory as a background and regards forms of media as cultural products which are relevant in socialization processes to the degree that these processes are dominant (see Bachmair 2007).
More abstract perspectives can be developed against the background of the distinction between medium and form in the theory of Niklas Luhmann, which conceives of media as a number of loosely linked elements that make forms perceivable as a number of firmly linked elements. Along these lines, Dirk Baecker understands «education [to be] in the medium of intelligence» (2006), distinguishing his position from Luhmann's view of the «curriculum vitae» as a communication medium of education (Baecker 2006, 22–23). It may be true that this abstract sociological perspective offers advantages, as he writes:

> It keeps its distance from educational science's ideologies of profession, and instead has recourse to attempts at feeding the modalities of differentiating the educational system back to social structures and their transformation. It does not adhere to the necessity of a reflection theory to confirm and foster the identity of the system to which it is proper, but instead focuses on the difference of the system in the context of society. There is plenty of cause for this since the conversion from print society to computer society does not leave the educational system untouched. (Baecker 2006, 25)

Apart from the advantage that contrasting perspectives in general facilitate insights which cannot be gained in the course of analyses that are inherent in a given discourse, this approach does not solve the problem of systematic coupling (*Anschlussfähigkeit*). Even if the choice of a communication medium as the primary focus for addressing a problem is well-founded, there must be a reflection on

[13] Such lists contain media like books, blackboards, photographs, film, DVD/CD-ROM, audio, video, Internet, learning platforms, smart boards, WWW, Java, Flash, Web 2.0, social media, etc.

[14] Recently, some have suggested quaternary media as a fourth option. These media are characterized by communications who use networked computers and have new interactive possibilities. Accompanying the digitalization and networking, the traditional roles of sender and receiver become varied and modified.

contextual dimensions of the selected frame of reference if «non-fundamentalist basic concepts» (Heyting 2001) are the goal.[15] This seems all the more important not only for educational systems and their academic study, but also other systems and other no less undisciplined disciplines find themselves in a crisis of orientation. Questions about limitations occur in connection with dynamics of pedagogization, but also of sociologiziation, psychologization or mediatization.

There is one theory of medial forms from Rainer Leschke (2010) which can be connected with cognitive philosophy, systems theory, information ecology, media ecology, social ecology, theories of action and application orientation. Discussing different notions of form, and continuing Ernst Cassirer's philosophy of symbolic forms, Leschke has developed a medium-range theory which makes the stability and dynamics of the medialized constellations adequately describable. These new constellations demand a new knowledge about forms, which is significant in the context of school types and teaching methods, among other things.

> While the complex of interpretative knowledge, identity construction and self-concept of the humanities was still largely based on the media-historical constellation of printing, which resulted in general reading ability and competence in meaning creation, the current medial constellations, with augmented reality, the intermedial migration of forms, and the unnoticeable transitions between entertainment media and functional media, require and generate first and foremost knowledge about forms. (Leschke 2008, 49)

This knowledge can relate to forms of play, narrative forms or interface logics, for example, but also to individual forms like menu control (e.g. pull-down menu vs. ensemble). What is important here is that such forms are now applied in different media constellations and not only in single media. If we accept that it has generally become problematic to orient the internal differentiation of knowledge systems by individual media and their dispositifs (see Leschke 2010, 303), then this is also valid for knowledge acquired at school, in the sense of book learning, and then transversal and transmedial dimensions also assume significance in contexts of school pedagogy.

Leschke (2010, 305) has suggested focusing on medial forms as classification tools in the transversally linked media system. His theory of medial forms (Leschke 2008) offers manifold possibilities of describing and analyzing the dynamics of forms and the exchange processes between different media as well as between mass media and art. In regard to media theory, it is compatible with more limited concepts of pattern formation (Winkler 2012), more broadly conceptualized theories of media

[15] Compare this to the discourse on epistemological contextualism (DeRose 1999 and 2006) and van Goor et al. (2004).

dynamics (Rusch 2007) and the theory of media culture of Siegfried J. Schmidt (2008). In contrast to comparatively concrete or very abstract concepts (see Figure 3), the theory of medial forms can be applied flexibly. It allows diverse and differentiated analyses of open structural formations in areas of tension between formal-aesthetic, content-related and temporal dimensions.

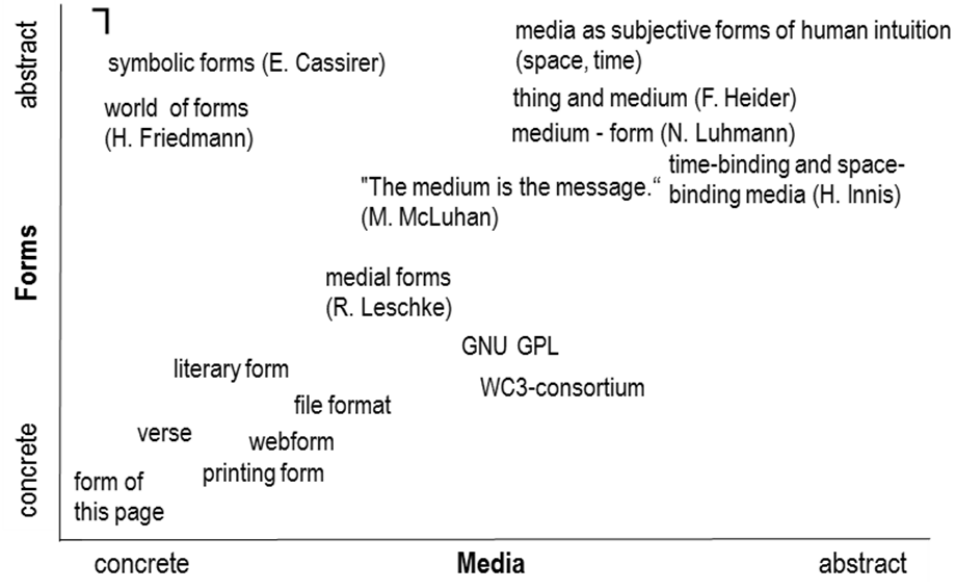

Figure 3: Forms and media: Scopes and selected examples (illustration by the author).

The knowledge of medial forms and their analysis is also relevant to the examination and shaping of cultural, social and education-related concepts and practices. Here are some examples which are significant to schools:

- Testing of school knowledge, evaluation based on the school grade system, group work, cartoons in textbooks, brainstorming, mindmaps (concept maps), etc.
- Hip-hop rhythms for learning purposes, webquests, creation of sequences of learning/teaching with freely usable game engines, collaborative writing with Wikis, etc.

In a transversally integrated media system, the key function of medial forms comes into effect in a double sense as the «material of media communication» and as «the ideation of media technology» (Leschke 2010, 300), in a way that steers clear of views of isolated phenomena that are restricted by either technological determinism or culturalism. In terms of processes of school learning and education, these forms can serve as *objects for reflection*, *means* and *constitutive moments*. On the one hand, they represent media-cultural resources for educational processes par excellence.

On the other hand, on meso- and macro-theoretical levels they offer reference points for clarifying dynamics of de-/recontextualization and of connections with pedagogization formulas and problems of reproduction (see Veith 2003, 183–201). Yet there is no reason to reduce the consequences for school and media pedagogy to elitist or middle-class perspectives, or to pass on a demand for education as a «(European, progressive, civically administrated regional expression» (Faßler 2010). On the contrary: If notions, processes and outcomes of education are considered as moments of the (co-)evolution of medialized constellations, the particularities of aspects of written culture and book culture and their «self-evident» character become comprehensible.

In view of these considerations, the focus cannot solely be on further differentiating «literality» as an educational task (see Bertschi-Kaufmann u. Rosebrock 2009) or expanding the imagery of literacy with regard to ever new «literacies» (see Hug 2012). The point is rather to spell out the relationship of literality, numerality, pictoriality, and orality in the formation process of forms.[16] Hence, broadened perspectives for reflection and action become possible which can be brought to fruition particularly in school contexts. If in the process different medial forms are made explicitly clear in their relative significance and function in contexts of communication culture, this also enables for example widened perspectives of establishing principles of media education for socially disadvantaged youth (see Niesyto 2004, 129).

As regards the use of conceptual and creative leeway between the «empty space» (Brook 1968) and elaborately designed didactics of all kinds, it seems reasonable also to take into account expanded perspectives beyond prevalent didactic arrangements and scenarios. In particular, more recent theories of design (see Krippendorff 2006) presents starting points for conceptual expansions.

Conclusion

This plea for expanded action orientations and reflective perspectives may meet with skepticism from school pedagogy for several reasons. Even if interdisciplinary considerations play their part in the context of debates on school reform and innovation (see Berkemeyer et al. 2010), application-oriented concerns (for example Schnebel and Keller 2011) generally get more attention in school development, and not only among the practitioners, than deliberations on theoretical principles. Although since the 1960s approaches based on (socio-)psychology, sociology, social sciences and cultural studies have in many respects attracted interest in the field of pedagogical research into schools, questions of internal and external legitimation have not become obsolete in the process. Quite the contrary: The

[16] A systematic examination of this relationship after the digital turn (Kossek and Peschl 2012), taking into account the scattered points of reference in relevant scientific discourses is still a desideratum.

traditional monopoly on education and information held by schools has become shaky, promises about advancement and the future have become questionable, and in many countries, economically oriented educational measurement and media-based administrative bureaucracies have long gained primacy over education-theoretically motivated or pedagogically oriented action in schools and classrooms. Finally, neither media-phobias fed by a sense of neuro-mission, nor media-euphorias distorted by learning technology nor sporadically extended forms of literacy[17] contribute to an adequate understanding of contemporary media and information ecologies.

It may be true, as Jürgen Oelkers et al. (2008) write in their reply to historical experiences with quality assurance in schools, that the introduction of standards has always been meant to improve quality (17) and that on the level of didactic teaching material

> innovations were and are disseminated quickly, without respect to national borders. It is no coincidence that usefulness in the classroom is a crucial prerequisite for effective implementation. Tools, media and technologies, in this sense know-how which crystallizes in tools, can be conveyed much more easily than relatively abstract, language- and culture-bound theories which require complex interpretation. (Oelkers et al. 2008, 19)

The theory of medial forms not only demands such complex interpretive work, it calls for a differentiated historical and systematic examination of the medial constellations of the educational claims, concepts and practices of schools. As in this process media come to the fore as a historically situated grammar of our educational conditions, the result is that (a) only now do convergent and divergent dynamics become adequately understandable in the international comparison of educational systems; (b) relatively stable, redundant structures in medial change become comprehensible in their significance for developments in communication culture in general and school culture in particular, (c) chances for school developments beyond innovation rhetoric and resistance to reform become visible and justifiable in a differentiated manner, and (d) challenges in view of globalizing educational developments and media ecologies become easier to deal with.

It remains to be seen to what extent these and similar media-theoretically informed suggestions will be taken up, ignored or rejected by school theory and application-oriented school pedagogy. So far, proposals for «media education in new cultural spaces» (*Medienbildung in neuen Kulturräumen,* Bachmair 2010) have sporadically

[17] For example art literacy, computer literacy, consumer literacy, digital literacy, diversity literacy, ecological literacy, emotional literacy, environmental literacy, film literacy, food literacy, geographical literacy, health literacy, information literacy, library literacy, multicultural literacy, numerical literacy, visual literacy, sexual literacy, television literacy, etc.

led to school trials and pilot projects, but in large part school is developed along the lines of «typographic educational architectures» (Böhme 2006, 114). However, the exploration of creative, conceptual and critical-reflexive latitude, even in institutionalized education, does not necessarily have to be restricted to literacy-based forms of the communicative stabilization of learning cultures.

The elaborations in this paper show that expansions are conceivable, if nothing else. To what extent they are in fact viable may remain open for now in view of the challenges related to innovative perspectives between the poles of economically inspired ‹schoolification› and calls for room for ‹de-schooled› learning – from Paolo Freire and Ivan Illich to user-generated education.[18] This much should have become clear, however: The plea for expanded action orientations and perspectives for reflection also refers to the range of established functions of schools, among them administration, allocation, integration, reproduction of the social structure, selection, socialization, qualification, and the passing on of culture and knowledge. On the one hand, these functions are to be critically reassessed under the conditions of medialization. On the other, what also matters is knowledge about forms of schools and teaching and their functions, and thus no less than enlightenment about the medialized constellations in which they appear. If we take this seriously, it also means reevaluating traditional notions of how education and enlightenment are related, and «Rethinking the Enlightenment» (Elkana 2011), taking into account that all knowledge, not just that acquired in school, is context-bound and medialized.

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[18] See http://usergeneratededucation.wordpress.com/.

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A Brief History of the Lecture: A Multi-Media Analysis[1]

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Abstract

The lecture has been much maligned as a pedagogical form. It has been denigrated as a «hot medium» that has long been «superseded» by the cooler dialogical and televisual forms. Yet the lecture persists and even flourishes today in the form of the podcast, the TED Talk, Kahn Academy and the «smart» lecture hall (outfitted with audio, video and student feedback technologies). This persistence should lead us to re-evaluate both the lecture and the role of the media that have been related to it over time. This paper examines the lecture as a site of intersecting media, as «a site where differences between media are negotiated» as these media evolve (Franzel 2010). This study shows the lecture as bridging oral communication with writing and newer media technologies, rather than as being superseded by newer electronic and digital forms. The result is a remarkably adaptable and robust form that combines textual record and ephemeral event. It is that is capable of addressing a range of different demands and circumstances, both in terms of classroom pragmatics and more abstractly, of the circulation of knowledge itself. The Web, which brings multiple media together with new and established forms and genres, presents fertile grounds for the continuation and revitalization of the lecture as a dominant pedagogical form.

1. Introduction

In recent texts on online and classroom pedagogies, the lecture has been labelled as old-fashioned «chalk and talk», as mere information transmission. The lecturer herself characterized as an antiquated «sage on the stage» --to be replaced by an interactive, constructivist «guide on the side.» A look at what is currently privileged in everyday practice, however, tells a different story. Video and audio podcasts of talks or lectures are common, with TED Talks and Kahn Academy presentations being a staple for students, teachers and technologists. Lecture hall feedback devices (or clickers) are popular as teaching tools, and the lecture circuit remains a forum of choice for even the most ardent advocates of online education. In my experience, it is not unusual to attend a presentation, like the TED («Technology

[1] This paper is a version of «The Lecture as a Transmedial Pedagogical Form: A Historical Analysis», originally published in *Educational Researcher*.

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Entertainment and Design») Talk «This is Bullshit [sic]» by Jeff Jarvis (2010), in which a lecturer takes to the podium only to decry lecturing and the lecture in general.
These contradictions can be clarified (but not entirely eliminated) by taking a look at the lecture as a form or genre, and at the complexities of its history and its communicative and «mediatic» dynamics. Such an examination shows that the lecture is a pedagogical form that interconnects multiple media --originally, spoken and written word; later audio, image and video. And it does this in a way that both reflect and reinforce prevailing *epistemologies*, approaches to knowledge and its propagation. It is, as Sean Franzel says, illustrative of the «intermediality of academic instruction», providing «a site where differences between media are negotiated» as these media co-evolve (2010).[2] The result is a remarkably adaptable and robust form that combines textual record and ephemeral event; and this form is capable of addressing a range of different demands and circumstances, both practical and epistemological. The Web, which brings together multiple media together with new and established forms and genres presents fertile grounds for the continuation and revitalization of the lecture as a dominant form. I begin this paper with examples of conventional critiques of the lecture, followed by a broad overview of its history in Western educational contexts. I conclude by discussing ongoing vitality and adaptability of the lecture today, and by explaining how it points to a broader, mediatic understanding of practices and technologies in education.

A forceful yet representative critique of the lecture is found in Diana Laurillard's *Rethinking University Teaching* (1993/2001), in which she evaluates a broad range of educational forms and media in terms of their systemic, informational functions. Laurillard labels the lecture, along with print, video and DVD as «discursive» or «narrative» media, and she expresses a widely-held view in saying that its informational function is one of transmission. Like a print run or a video broadcast, the lecture, she maintains, works to disseminate information to its audience. It is representative of «non-interactive... linear presentational media» that are above all associated with a «transmission model of education» (91, 93). However, unlike other narrative or presentational media, the lecture is singled out by Laurillard and others as profoundly defective, inefficient and outmoded. It is, she asserts, «a very unreliable way of transferring the lecturer's knowledge to the student's notes», suited only to «what is elegant or pleasing» rather than what is «difficult and complex» (94). Laurillard and others critique the lecture as a kind of atavistic throwback to «narrative form of the ancient oral cultures», representing a kind of

[2] This paper was inspired by Sean Franzel's presentation, The Lecture: A Case Study in the Intermediality of Academic Instruction, given April 10 2010 at Media Transatlantic: Media Theory in North America and German-Speaking Europe. See the conference program http://www.mediatrans.ca/final_conference_program.pdf for the abstract of Franzel's talk, and http://www.mediatrans.ca/Sean_B_Franzel.html for an audio and video recording of the same.

«residual orality» in an era in which text is the dominant and most efficient medium (Brent 2005, n.p.; Jones 2007, 398). Laurillard goes so far as to say that such residual practices should be insufficient for any university that sees itself as «not enfeebled by tradition»:

> Why aren't lectures scrapped as a teaching method? If we forget the eight hundred years of university tradition that legitimises them, and imagine starting afresh with the problem of how to enable a large percentage of the population to understand difficult and complex ideas, I doubt that lectures will immediately spring to mind as the obvious solution. (93; see also King 1993)

The survival of the lecture to the present day, in other words, cannot be explained in terms of the transmission of knowledge, for there are many more powerful and effective ways to do this, as Laurillard makes clear. Its endurance is not due to its efficacy as a solution to any pressing educational problem; instead, Laurillard insists, it can be explained only in terms of an enfeebling «eight hundred years of university tradition» (93).

In this paper, I argue that the centrality of the lecture over 800 years of university life is not due to historical inertia, but arises from its ability to reinforce rather than enfeeble academic practices and priorities.

2. The Lecture as Cultural Preservation

Laurillard and a variety of others – including Marshal McLuhan and Walter Ong – are correct in observing that the lecture is «rooted» in ancient oral cultures or «human orality» (Ong 1982; Brent 2005, n.p.; Jones 2007, 398). But I believe they are mistaken in the inference they draw from this observation: They conclude that it is a kind of «residual» communicative form that has long been replaced by textual and newer electronic media: «The sheer quantity of information conveyed by press-magazines-film-TV-radio», as McLuhan puts it, «far exceeds the quantity of information conveyed by school instruction and texts. This challenge has destroyed the monopoly of the book as a teaching aid» and has rendered the school «an obsolete detention home, a feudal dungeon» (1960a, 1; 1960b, 207). But the lecture, I argue, is more effectively understood as *bridging* oral communication with writing, rather than as being a purely spoken form that is superseded by textual, digital or other media technologies and other mediatic forms.

As Laurillard's remarks indicate, the history of the lecture goes back far before the advent of the printing press to the early middle ages. This is an era when even basic textual information was scarce, and when media were constituted and interrelated rather differently than today. The lecture played an indispensible

role in education, but one very different from the informational functions of transmission or dissemination. Especially in the early middle ages, the capacities and resources for reading and writing were scarce and jealously guarded, the lecture was less about broadcasting knowledge than it was about rescuing a written cultural heritage from irretrievable loss and decay. (For example: Lucretius' epicurean classic, *The Nature of Things*, is a part of Western tradition because it was discovered by Poggio Bracciolini, an Italian scholar, who recognized the title from his reading of Cicero. He lent the manuscript to a friend, and it was later lost. But befor that occurred, his friend made a transcription, which then served as the basis for the more than fifty other copies that launched the text as an early modern classic.)

The medieval meaning of the word lecture is to *read* or *read aloud* (meanings reflected in the Latin root *legere* and in French and German cognates today), and that is precisely what a lecture was: a reading or dictation of selections of an authoritative text, most often the Bible or an ancient authority. Books were specifically designed to fit on a podium or *cathedra* as it was then called (Briggs and Burke 2009, 54). Books were also sometimes written in *scripta continua*, without spacing and punctuation, requiring vocalization in order to be deciphered. (Arabic writing and older forms of the Hebrew alphabet did not have ways of indicating vowels, *mkng vclztn whl rdng ncssry*.) As a result, personal, silent reading is believed to have been relatively rare. Public readings were a popular form of entertainment, and in attending lecture courses, one spoke of going to «hear» the corresponding «books» being read (see: Wieruszowski 190). In these senses, one could say that the act of reading was typically an act of lecturing (a «reading aloud»), and that a lecture was almost always a matter of reading. The two were functionally equivalent.

This was also a time when knowledge and truth were seen as having been passed from God to Adam, and (via Hermes Trismegistus, as some believed) to the present in the form of ancient texts. Teaching and learning were conceptualized as acts of «*recovery*» of this tradition rather than novel «*discovery*» of something radically new (Harbison, as cited in Eisenstein 1997, 123). Consequently, the lecturer could only serve as a kind of conduit for knowledge from the past, with his students (both were generally was a male) providing a way of reconciling contradiction and giving fuller meaning to these sources. The idea of speaking or extemporizing on one's own ideas was unknown, and in fact, the lecturer be fined for departing from a slavish dictation the text at hand (Eisenstein 1997, 524). Thus, the lecture or the sermon, as it was also known, was a site of slow oral dictation, careful memorization (Clarke 2006, 68–73) and painstaking note taking.

> Teaching in the medieval university involved different oral exercises and associated writing... medieval students engaged in various kinds of note-taking from oral teaching, including making minor changes to a ready-made text brought into class, taking more or less sketchy *reportationes* of oral teaching delivered at higher than dictation speed, and copying out under dictation the full text of a course.... large numbers of surviving manuscripts attest to the prevalence of full-text notes taken by students from dictation.... (Blair 2008, 44, 46–47)

This note taking, however, was not just for personal reference and study; it could serve as a way of reproducing the texts themselves. Particularly in the early centuries of the development of the universities, «the simplest way of getting [books]... was for the teacher to dictate the texts to his pupils» (Hajnal 1954, as quoted in McLuhan 1962, 95). The result is that «drifting texts and vanishing manuscripts», copied by students or monks effectively constituted the body of written information available to the culture. It was the task of educational institutions to preserve this vulnerable heritage «from one generation to the next», above all «by writing» (114).[3]
In the 1450's into this world of informational paucity, the printing press unleashed an era of relative informational abundance. As one account from the early modern period opines, through the printing press, texts were

> multiplied, as now a book is reproduced many thousandfold. Therefore if one, two, three, ten or twenty are burnt or otherwise are given up, there are still very many additional others, so that a book is never totally lost... (Annonymous; see figure 1)

Naturally, this plenitude of printed information presented a challenge to the function of the lecture as a means of textual reproduction, as a site of dictation and verbatim note taking. Elizabeth Eisenstein reports that as books gradually become cheaper and more plentiful, lecturing professors were no longer unrivalled as a sources and masters of information and learning:

> Gifted students no longer needed to sit at the feet of a given master in order to learn a language or academic skill. Instead, they could swiftly achieve mastery on their own, even by sneaking books past their tutors – as did the young would-be astronomer, Tycho Brahe. «Why should old men be preferred to their juniors now that it is possible for the young by diligent study

[3] I owe a special debt of gratitude to Emily Hutchison of Thompson Rivers University for her help with this discussion of the medieval lecture and student note-taking.

> to acquire the same knowledge»? asked the author of a fifteenth-century outline of history. (Eisenstein 2005, 38)

As Laurillard's arguments and as Brahe's example shows, the printing press rendered the preservative and transmissive function of dictation and note-taking redundant in a narrow, functional sense. Despite this, the lecture remained for quite some time the dictation of a text by older men and slavish note-taking by the young. In fact, the «revolution» of the printing press, and the attendant explosion of written material (albeit a slow ones, unfolding over two centuries or so) did not mark a particularly neat transition of any kind for lecturing and note-taking. As the rest of the world was veritably transformed by ready access to the Bible and other print material, dictation and note-taking persisted – despite some variance in practice – largely as if nothing had happened. As the Renaissance replaced God with man in culture, and the Reformation exchanged the icon for the book in religion, the lecture retained its basic outlines. This persistence raises some questions: Are there reasons *other* than institutional inertia for the persistence of the lecture as dictation post-Gutenberg? And if the lecture is doing more than transmitting information in an early version of our own information explosion, what exactly is it doing?

Although I return to these questions later, the Gutenberg revolution makes it clear that practices in the lecture hall are not to be understood primarily in terms of information. The abundance, scarcity or efficient transmission of information is not so much the concern. The significance and persistence of the lecture over its 800 year history, in other words, cannot be explained in the terms (information, its transmission) applied retroactively by Laurillard to the university's history. For if the lecture were a question of more efficient textual transmission replacing antiquated oral communicative forms, it wouldn't have been necessary to wait for radio, TV, DVD or Internet to render it redundant. The advent of the printing press alone should have clearly marked the end, or at least the beginning of the end, of the lecture.

The longevity of the lecture puts the theory of knowledge behind these types of argument into question. The lecture is not simply one way of communicating knowledge among many others, as if knowledge was only so much data, to be combined with the most efficient means of transmission as they become available. Knowledge is instead inextricably merged with pedagogical forms, and the nature of these forms is as much about culture as it is about informational function. In this paper, I show how knowledge is enacted and performed in the lecture, and this enactment and the knowledge brought to life with it, changes over time. When textual scarcity reinforced an understanding of knowledge as more a matter of recovery than discovery, the lecture was configured in terms of the authority of

the textual sources from which this knowledge was recovered. The processes of dictation and notation ensured that the lecture did not stray far from this textual authority. Oral performance or speaking in the lecture hall was necessitated by and grounded in the authority of the text, not in the authority or charisma of the delivery or the speaker. Even though it was reinforced by textual scarcity that disappeared with the printing press, this conception of textually-grounded knowledge and its enactment through dictation persisted long after the era of Gutenberg. Conceiving of knowledge apart from the authority and the book seems to have been as difficult in the medieval and early modern period as it is for us today to conceive of it apart from, information and its circulation. And just as the view of knowledge as textual authority was reinforced by the scarcity of the book in the middle ages, our current view of knowledge is authorized by the many technologies and practices of circulation and transmission that have become part of our everyday lives.

3. The Lecture as Authorial Performance

The shift from the dictation of an authoritative text to the various forms that the lecture has taken today did not occur in a clear or steady progression, or through a one or more epochal changes. But aspects of this shift can be traced through the rise of what are known as glosses and commentary in the early modern period. At the time of the manuscript, explanatory notes were written and copied into the margins of an authoritative text, assisting the lecturer in his explanation or *commentary* of a given passage. «In the beginning», as the Catholic Encyclopaedia notes, «masters noted down on their own copies... a few words by way of résumé, and as a help in their lectures» (Boudinhon 1909, n.p.) Later, glosses themselves would be considered authoritative, allowing a professor to «'read' an exemplar already provided with an authorized 'gloss' which aided interpretation and itself became an object of commentary» (Verger 2000, 836). Glosses in this sense facilitated a move away from slavish dictation in the lecture, enabling the gradual emergence of different forms of commentary as ways of mediating between the traditional textual record, and the contemporary reader and his audience. Clark indicates a gradual shift from linear dictation to more unfettered commentary, saying that by the middle of the seventeenth century – again despite great variance in practice – the two were competing for dominance:

> A 1642 lecture plan for the Jesuit philosophy faculty at Ingolstadt, for example, set an ideal...the first half hour of each lecture was to be for dictation and the second half hour for glosses and exegesis. Many early modern lectures seem to have become chaotic commentaries, or remained readings aloud, dictations page by page of a textbook. (2006, 83)

Clark goes on to say that out of concerns for educational quality, the subsequent century saw a number of governments outlawing dictation altogether. «The eighteenth», Clark continues, «appears to be the century when dictation was first stopped, even if only erratically at first» (2006, 85). In other words, it is only some 300 years after the invention of print that a number of its functional attributes, are decisively integrated into the lecture. Clark goes on to say that one place and one person in particular marked a radical break with the dictated medieval lecture or sermon:

> [It is in] the 1790's in the University of Jena [that Johann Gottlieb] Fichte became one of the first German professors who began officially lecturing without a set text... Fichte and other Romantics began lecturing on their own work without any pretense that that they were glossing a text or recapitulating a tradition... Departure from an actual or even virtual textbook as a basis for lecturing constituted the ultimate break with the sermon [or medieval lecture]. (410)

Fichte was a German idealist, a romantic philosopher, a landmark university administrator, and by all accounts, an outstanding public speaker. As a lecturer, he was characterized by his fellow romantics Goethe and Hegel as «extraordinary» and «rapturous.» The theologian Friedrich Schleiermacher, also the founder of hermeneutics as a method of interpretation, recognized Fichte's «splendid gift of clarity», but dismissed his «rhetoric» as only serving purposes of «fomentation» and «defamation.» It is reported that Fichte could lecture from a complete text as if he were speaking freely, that he could also speak fluently and at length from a single page of notes. He mocked those professors who could only «*recite* what lies printed on the page for all to see» (Fichte, as quoted in Kittler 1992, 155). In a 1794 lecture «concerning the difference between the spirit and the letter within philosophy», Fichte himself says that his principle concern is not what «is printed in books for us to read», but rather, «what has stirred and transformed our spirit» (207). Correspondingly, the lecture for Fichte was not about the authority of the book, but about the spirit which he wished would enliven the audience just as it enlivens the speaker: «... the wish with which I conclude today's lecture», Fichte says, «is that ... from time to time I can succeed in scattering in your souls fiery sparks which will arouse and stir them» (198–199).

Coming to expression in Fichte's hopes to stir the souls of his audience is a radically new way of understanding knowledge, one that implies a new relationship between text and speech in the context of the lecture. It is the speaker and his own words and ideas that are important. The value of these words and ideas, moreover, is understood in terms of their effect, like Fichte's, on his contemporary audience. As Clark explains,

> Fichte and other Romantics began lecturing on their own work, without any pretense that they were glossing a text or recapitulating a tradition. ... In Romantic Jena and elsewhere, the cathedra [or podium] became a locus where one created knowledge, became a site of the new, radical stress on spontaneity, creativity and originality. ... a new relation between the Romantic «I» pontificating from the cathedra and the academic chorus [or audience began to emerge]. (410)

The lecture, in short, was no longer about the authority of the text, it is about the authority of the lecturer. The lecturer, in other words, is not a conduit for a tradition received from the past; nor is his or her task even a kind of commentary on this tradition. The medieval practice of interchangeable lecturers reading from the same authoritative texts loses its meaning and value. What is instead meaningful and valuable is one lecturer speaking his mind and standing as the authentic origin of his speech – as the author of his spoken thoughts and words.

Also seeing Fichte's example as «epochal», media theorist Friedrich Kittler describes Fichte and his Romantic colleague as enacting a specifically hermeneutic epistemological and mediatic configuration. As an explicit «method» to be used for interpretation or understanding, hermeneutics applies primarily to the text, but what is ultimately most important for hermeneutics is the *spirit*, rather than the *letter*. As the originator of hermeneutics as a formal area of study, Schleiermacher described it as a process of recovering to spirit what might otherwise be lost to the letter. Describing thought itself as a kind of inner speaking that is externalized in talking or writing, hermeneutics for Schleiermacher represents a kind of reversal of this externalization process. Every «act of understanding», Schleiermacher asserts, «is the inversion of a speech-act (*Akt des Redens*), during which the thought which was the basis of the speech must become conscious» (1998, 7). Meaning has its origin in the spirit of the speaker; it is temporarily externalized and enacted through speech, and it finally returns to the inner speech in the minds or spirits of audience members. The written text, or even grammar and rhetoric are all important for Schleiermacher, but they have value only insofar as they are interpreted or brought to life as *thought*. The text or written words (and to a lesser extent, speech itself) are only so many supports or prompts to realize and sustain the life of the spirit, or more modestly, of understanding and meaning.[4]

[4] It appears that the pedagogical innovation of Fichte and his fellow Romantics took some time to reach American shores. John Dewey writes in 1891 of «the introduction of the lecture system» as gradually doing away with «recitation» and «vicious methods of *rote* study» (1969, 147; emphasis in original). He also envisions the «mediatic» evolution of this pedagogical form as taking place through «an increasing use of the printing press in preparing outlines, syllabuses, selections from authorities, etc. ... giv[ing] us a cross between the seminary [i. e. seminar] and recitation methods» (147).

For similar reasons, the texts of both the speaker and the note-taker in the lecture hall are important only insofar as they capture and enable the creativity and originality of the speaker. Whether the lecture is a lively rendition of a verbatim transcript, or an extemporization based on a series of talking points, or delivered entirely «off the cuff», what counts is its authenticity. Student note taking, similarly, is not valued as a means of creating a verbatim record of a recitation, but becomes more a question of capturing the creativity and originality of the speaker --which sometimes was not recorded in any other form. The notes of students form the basis for some of the pivotal works of 20th century theory and philosophy, as is the case for Ferdinand de Saussure, Ludwig Wittgenstein and Jacques Lacan.

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4. The Lecture as Dramaturgical Effect

Speaking of the 20th century of course takes us into a period where multiple technologies for projection, recording and transmission were added to text and speech in the mediatic mix of the lecture. The lectures of Michel Foucault at the *Collège* de France and those of physicist Richard Feynman at the California Institute of Technology, for example, are with us today thanks to audio and video recordings, rather to than faithful student note-taking. Radio and TV also extended the contemporaneous reach of the lecture, with famous examples of broadcasts including the Canadian Massey Lectures, as well as lectures by Theodore Adorno (despite his vociferous critique of mass media). At the same time, different kinds of projection media extended the content of the lecture beyond the spoken word. As one example, the overhead projector (like many other instructional innovations) was first applied to educational use during the Second World War by the US military, and was introduced in its canonical commercial form by 3M in the 1960's.

Despite these changes, the lecture still, it seems, retains many of its epistemological traits and media combinations from Fichte's time. Perhaps the most significant difference is simply in the way these are articulated. This is illustrated by sociologist Erving Goffman's chapter on «The Lecture» in his *Forms of Talk* (1981). Originally delivered at the University of Michigan in 1976 as the Katz-Newcomb Memorial

Lecture, Goffman's text provides a kind of secularized update of earlier idealist and romantic accounts of the lecture as an almost Pentecostal propagation of spirit. The uneasy relation between the «dead» letter and the animating force of speech reappears in Goffman, as does the related issue of the authenticity of the speaker as the origin of his or her own words. But these are all given a contemporary twist: In place of souls, spirits, minds, inner speech and thoughts, Goffman makes use of his principle contribution to sociology. This is his idea that any one person is an amalgam of multiple selves, an idea that today is familiar from the opposition of the «inner child» and the «adult self.» Except that the lecture, for Goffman, involves selves of a rather different nature, involving primarily the «textual» «dramaturgical» and «self-as-animator.» According to Goffman, the «whole» self is constituted as a kind of «dramatic effect arising from a [given] scene» (1959, p.252) with different selves emerging in different situations and moments. Instead of «fiery sparks» of thought and understanding, Goffman focuses on «talk» and its potential to be extemporaneous or «fresh.» Speaking of «the multiple senses in which the self of the speaker can appear» in the lecture (173), Goffman says that one particular self will inevitably be most important:

> At the apparent center will be the textual self, that is, the sense of the person that seems to stand behind the textual statements made and which incidentally gives these statements authority. Typically this is a self of relatively long standing, one the speaker was involved in long before the current occasion of talk. This is the self that others will cite as the author of various publications, recognize as the holder of various positions, and so forth. … And he is seen as the «principal», namely, someone who believes personally in what is being said and takes the position that is implied in the remarks. (173)[5]

The textual self is responsible for the content of the lecture rather than for its delivery or its form. As Goffman puts it, this textual self is one that «can be displayed entirely through the printable aspects of words[, as] an emanation from the text itself. According to Goffman, it exists alongside a second self, which one might call the «embodied self» (although Goffman does not give it a name himself). This self is physically present in the lecture, and sometimes obtrusive, when as Goffman says, it would clear its throat or take an occasional drink of water. A third self involved in the lecture is the «Self-as-animator:» «the person [that] can be identified as the talking machine, the thing that sound comes out of» (167). It

[5] Goffman is taking as his paradigmatic example the kind of «invited» guest lecture that he himself was giving at the University of Michigan. This is one in which the speaker's credentials are often enumerated in his or her introduction, and are often known in advance in general terms by the audience. As we shall see below however, speaker and text, presence and substance remain central to the classroom lecture as well.

is that is responsible for enacting the lecture. This last manifestation of the self «that is intimately responsive to the current situation», venturing clearly beyond the text, for example, in remarks offered as asides, or in the context of openings and closings. The self-as-animator, in these instances, takes over from the textual self, and is itself the source of its own speech or content: «In the case of fresh talk, the text is formulated by the animator from moment to moment, or at least from clause to clause» (171).

Although he does not say it explicitly, the goal for the lecturer for Goffman is in effect a kind of combination or collapse of the textual self and the self-as-animator (while keeping the stumbling, throat clearing *physical* self in check). The self that is addressing and responsive to the occasion should be indistinguishable from the self that is supported and sustained by the text. This is achieved, according to Goffman, through a particular way of combining media. It is done by leveraging and aligning text and speech, or written and oral forms in very specific ways. Goffman outlines three ways of aligning these two media that were common in his day:

> In our society we recognize three main modes of animating spoken words: *memorization, aloud reading* (such as I had been doing up to now), and *fresh talk*. In the case of fresh talk, the text is formulated by the animator from moment to moment, or at least from clause to clause. Fresh talk is perhaps the general ideal and (with the assistance of notes) quite common. …[Still] a great number of lectures (because of my incompetence, not including this one) depend upon a fresh-talk *illusion*. (171; only last emphasis added)

Goffman makes explicit what is implicit in Schleiermacher's notion of the hermeneutic «speech act», and in Fichte's emphatic differentiation of letter and spirit: Namely, that the ideal for the lecture is the successful creation of an illusion. Parts of the lecture may be memorized, but in a long-standing tradition, academic lectures are generally read aloud. And in reading aloud, what the lecturer strives to create is the *illusion* of spontaneity and extemporaneity. The speaker is in this way able to appear as a conduit between his own thoughts and those of the audience. As Schleiermacher or Fichte might put it, it is through the illusion of lively reading or delivery of the «dead letter» that the speaker to bring to life in the audience the thought which was the basis of the speech in the first place.

Fichte's ability to speak freely from both notes and a verbatim text—once seen as a gift worthy of special notice by his illustrious contemporaries—is later portrayed by Goffman as a general ideal, something that should be the goal of every effective speaker. «A great number of lectures» as Goffman says, «depend on a fresh-talk illusion» (172). The take place through a performance or act, a kind of sleight of hand. But at the same time, it is obviously not an act of magic. Goffman makes this

clear by saying: «Your effective speaker is someone who has written his reading text in the spoken register; he has tied himself in advance to his upcoming audience with a typewriter ribbon» (190).

It is media, in this case the typewriter and typewritten word, which help make the fresh talk illusion a widespread phenomenon. The lecturer is to use these skilfully and methodically to craft, check and revise her lecture well in advance of its delivery, to ensure that her delivery appears as direct, responsive and even as spontaneous as possible. Today, Goffman's typewriter and ribbon have given way to a panoply of devices and media technologies, from a word-processor and printer, to PowerPoint with its speakers notes and bulleted lists. In the case of a podcast or videocast lecture like a TED Talk or Kahn Academy presentation, this range of media and bag of tricks is greatly enlarged, extending from careful audio and video editing, through to teleprompting techniques or overdubbing.

5. The Future of an Illusion

Why does all of this matter for education? This account of the history of the lecture from the medieval cathedra to the fresh talk illusion highlights both continuities and changes in pedagogical practice in higher education. It suggests that the persistence of the lecture as a pedagogical form is not simply a matter of inertia and tradition, but that it is due to its flexibility and adaptability in response to changes in media and technology, as well as culture and epistemology. In fact, it would probably be more accurate to say that the lecture co-evolved with these larger developments, with its changes in the performance and meaning of the lecture helping to support and provide direction for developments in culture, as was the case with Fichte's speeches and Schleiermacher's hermeneutics. Not only does this way of understanding the lecture explain its persistence over its 800 year history, it also augments and reinforces ways of understanding the characteristics of good pedagogical practice. It provides a way of explaining what is important in this type of practice, and for predicting – or at least providing evidence for imagining – how it might change in response to future technological developments.

To speak first of pedagogical practice, the idea that the lecture is primarily about tying oneself to one's «audience with a typewriter ribbon», about using available media technologies or techniques that are described colourfully but consistently in terms of vitality, action or animation is central: Studies of effective lecturing or «how to» publications on the lecture are full of suggestions on how to achieve these effects, on how to bring a body of knowledge alive in the mind of the student audience. Aside from the most pragmatic and cognitive aspects (e.g. asking the lecturer to be prepared, and to structure but vary his or her presentations), these publications focus on the «self-as-animator», on fresh talk, on ways of arousing and stirring the attention and thought processes of one's listeners as a hermeneutic

speech act. Consider for example these point form recommendations from «Lecturing to Large Groups», a chapter in *A Handbook for Teaching and Learning in Higher Education* (Morton 2009). Lecturers, the author says, should work to:

- share their passion and enthusiasm for the subject by telling students why they are personally interested in this topic. Where possible, this could be a link to their personal research;
- link the lecture to some current news or activity
- use relevant and current examples to illustrate the point;
- ... draw on the students' experiences;
- use rhetorical questions to encourage students to keep on track;
- use live links to the web to demonstrate currency of the material being presented. (60)

To put this in the language of Fichte and Goffmann, it is clear that these recommendations are not about the textual self, about the dead letters prepared well in advance of the lecture. They are instead about the aside and the extemporization, about the illusion of fresh talk or the kind of fluid rendition of a complete or partial text that someone like Fichte was able to perform. It the sense of performing the «speech act» that Schleiermacher sees as essential to understanding: «the thought which was the basis of the speech must become conscious» in the audience in terms of their own thoughts and concerns.

Another way to put this would be to say that the effective lecture is an interpretive, *hermeneutic* exercise, in the sense of the term provided by Schleiermacher and hermeneuticians coming after him. It enacts and confirms the hermeneutic conception of knowledge as meaning or understanding circulating through a «speech act» – rather than authorizing the medieval conception of textual authority or even the modern view of knowledge as information to be stored, processed and transmitted. Hans-Georg Gadamer, a twentieth century hermeneutician, provides an updated account of knowledge as an act of interpretation, and of its relationship to oral and written media. «Interpretation», Gadamer says, «is performed by spoken language» (2004, 362). «Reading the text» by speaking it, he continues, is «the highest task of understanding» (392). And through this hermeneutic act of the lecture, he concludes, «written tradition is brought back… into the living present of conversation» (362). The lecture, in short, transforms the artefact of the text into an event – an event in which the text is brought into conversational relationship with the audience and with the present.

Understanding the lecture in terms of a specifically hermeneutic way of knowing and communicating brings me to the conclusion of this paper – and from matters of practice to questions of theory. On the basis of this paper's analysis

of the mediatic history of the lecture, it is possible to derive a set of general observations concerning the relationship between different media technologies in pedagogical contexts. First, this analysis has shown shows how the logic of mediatic and technological change in education is not successive but cumulative. Pedagogical forms that are rooted in orality such as the lecture are not simply done away with because new media develop that are supposedly superior or more efficient. McLuhan was in this sense wrong to insist that the «sheer quantity of information conveyed» by new media, on its own, would render the school «an obsolete detention home.» Instead of being replaced or rendered obsolete, the lecture with its oral roots is complemented, augmented and reconfigured through changes in textual technologies. The printing press gradually freed the lecture from the need to simply preserve information, and enabled it to increasingly reflect the position of the individual lecturer, as well as the living present of the audience. The subsequent introduction of audio, video, and visual aids for the lecture (overhead projectors, PowerPoint, even teleprompters) further enhanced the lecture's possibilities. These technologies have been increasingly arrayed around the lecturer and the lecture in support of her and her lecturing performance. They sustain and reinforce the illusion of the lecturer being the authentic origin of her own words. The role of related technologies in broadcasting and podcasting the lecture are similarly cumulative and complementary in their effect. This accumulation and augmentation, moreover, occurs not through a logic that reflects the indifferent operation of laws of necessity and maximal efficiency, but the more rounded contours of historical and cultural change.

The idea that change in media occurs through gradual, culturally-mediated accumulation rather than abrupt succession implies that individual innovations in media are not in themselves decisive. What is more important than individual media is the relation between different media forms and practices. The lecture takes its shape through its position at the intersection of oral and written forms, being first manifest as dictation and manuscript reproduction, then as authorial performance and finally as a dramaturgical effect that relies on textual and other media. Speaking of the last of these, Goffman points out that this dramatic effect can be realized by exploiting three possible ways of aligning text and spoken word: as memorization, as reading aloud and as (more or less) free talk. The options, Goffman is saying, are about how the oral and written are connected and configured. Of course, today there are more options with PowerPoint's speaker's notes and other software and hardware technologies developed in support of the lecture.

The relationships between writing and speech, and also between visual and audio media instantiated in the contemporary lecture, are fraught with tension and contradiction. This begins with the fact that the lecture is never simply oral, although in its modern form, it constantly seeks to give this illusion. It is the *illusion* of pure

orality. These tensions are only increased, with video and audio foregrounding the non-textual, and PowerPoint and Smartboards (for example) providing ways of highlighting text --with both basic types of media (oral and textual) offering new ways to refine and heighten the sleight of hand that underlies the modern lecture. These relationships embody different epistemologies or beliefs about knowledge. They begin with text-as-authority; this gradually gives way to self-as-source. But despite this shift, the text still retains some of its authority, meaning that the ability of the lecturer must conceal but not in fact erase or do away with the power of this authority.

Given recent developments in these areas, the future bodes well for the illusion that we know of as the lecture. The dynamic and multimedial mix provided by the Web presents many possibilities for the lecture that can confirm its current – and longstanding – function of creating a living present for conversation. It does so not only by capturing the lecturer as performer and animator in audio and video, but by providing new and varied ways of inserting this performance into a living present. The lecturer in a TED talk, for example, is not only able to perform for the live audience at the occasion of the talk itself; his or her lecture is also situated in a quasi-conversational context when it is embedded in YouTube or elsewhere on the Web, surrounded with viewer comments and related videos. There is the promise of more elaborate technical aids for the lecturer, in terms of new presentation tools such as Elluminate Live, Voicethread, Adobe Captivate or Prezi. Combined with these and other technologies, the live lecture is open to new forms of what Goffman (and others) refer to as «backchannel» and more conversational participation. This can be accomplished, for example, through twitter, with this backchannel communication projected behind the speaker for an instantaneous conversational effect. The future of this illusion, in other words, is bright.

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Open Educational Resources and Informational Ecosystems

«Edutags» as a connector for open learning

Michael Kerres and Richard Heinen

Abstract

Teaching and learning in school essentially relies on analogous and digital media, artefacts and tools of all kinds. They are supported and provided by various players. The role of these players for providing learning infrastructures and the interaction between them are discussed in the following paper. Increasingly, Open Educational Resources (OER) become available and the question arises how the interaction between these players is impacted. On the one hand, some players implement closed informational ecosystems that might provide a rich and coherent environment for learning, but also lock the users into a defined and often restricted environment. On the other hand, other players are interested in developing an infrastructure that supports open learning without the boundaries of closed informational ecosystems. Such open informational ecosystems must provide interconnections to numerous, in principal, unlimited number of platforms for learning contents. In the context of the project «Edutags» a reference platform is being implemented by way in which the contents of various providers are being connected and enriched through user-generated tags, commentaries and evaluations. The discussion points out that such an independent reference platform, operated separately from content platforms, must be considered as an important element in an open and truly distributed infrastructure for learning resources. Hence, we do not only need open educational resources to support open learning, we also need to establish an open informational ecosystem that supports such approaches.

Background

In the cooperation project «Edutags» the Learning Lab of the University Duisburg-Essen is, together with the Deutsches Institut für Internationale Pädagogische Forschung (DIPF = *German Institute for International Pedagogical Research*), developing a reference platform for teaching and learning resources that is to be deployed in the context of the German Education Server (Heinen and Blees 2011). The question is thereby raised as to the functions such a platform might have for teaching and learning in schools and how this may be embedded in the landscape of the different kinds of platforms and applications that are required for the scholastic use of teaching and learning resources.

Kerres, Michael, and Richard Heinen. 2014. «Open Educational Resources and Informational Ecosystems: ‹Edutags› as a connector for open learning». *MedienPädagogik* 24 (Educational Media Ecologies): 154–173. https://doi.org/10.21240/mpaed/24/2014.10.01.X.

The starting point for the conception of «Edutags» as a «social bookmarking» tool was an analysis of the interaction of the platforms and players that are necessary in order to make teaching-learning materials extensively available. In this context, the significance of a **reference platform** became evident when educational resources are to be operated as an open information ecosystem in association with a number of other platforms and players. Furthermore, it became clear that the availability of open educational resources alone is not sufficient to provide an appropriate environment for the sustainable use of these materials for teaching and learning in schools. We need to look more broadly at the informational ecosystem and how this informational ecosystem supports the use of open educational resources. Thus, we do not only need more open educational resources to support open learning, we also need to provide an open informational ecosystem that supports these approaches.

The following article presents the results of an analysis of the interaction between platforms, and contrasts the conditions of usage of learning materials in closed as opposed to open ecological systems. It thereby tries to reach beyond analyses that have described and examined single platforms for teaching materials (Gaiser, Hesse, and Lütke-Entrup 2007, Kos et al. 2005, Petko 2010). The concept of the reference platform «Edutags» is outlined and what it has to offer as a go-between for establishing an open ecological system of educational resources is described.

Conditions for the use of learning resources

As a starting point for the planning of a reference platform, the question was looked into as to how teaching staff find educational media and teaching materials for their lessons, how they prepare such materials for their lessons, as well as the nature of obstacles with which they encounter. To this end, the technique of working with focus groups was often applied in the course of the project. The focus group method proffers itself as the platform «Edutags» is still in development. The requirements and appraisals of the target group may thus be easily integrated into the development process (Morgan 1997). The members of the focus groups were chosen by taking a number of different aspects into consideration. The groups were made up both of regular teaching staff who considered themselves to have an affinity for digital media, and of teachers who act as didactical advisors either in schools or of expert groups. The teachers were joined by persons working in various phases of teacher training and future teachers currently being trained at college and in seminars for teacher training.

In the focus groups it became evident that teaching staff spend a considerable portion of their preparation time looking for materials of various kinds for their lessons. Teachers wish to find possible resources quickly and easily that (a) are suitable for their intended purpose and have, as far as possible, been «tested»

so that they may be certain of being able to make use thereof in their lessons, (b) without any legal concerns and (c) without any additional costs.
These three requirements will be illuminated below in more detail. The first aspect addresses the question of quality and quality assurance in connection with teaching resources, the second deals with legal questions, and the third relates to costs and thus to business models by way of which teaching resources are made available to schools.

Quality and quality assurance
In the case of the traditional school textbook, quality assurance is impacted by a combination of measures. It arises, in close connection with teaching timetables and curricula, mostly within a team of authors who are supervised by an editorial office. Moreover, most of the Federal States in Germany have an approvals procedure for educational works. Educational works, as defined in these approval procedures, are textbooks that are oriented towards teaching plans or standards of a school subject. Deployable as a key medium in lessons, they encompass teaching materials for an entire school (half-) year (cf. Stöber 2010, 5). These approval procedures fundamentally do *not* relate to supplementary teaching and learning materials; digital media in particular are explicitly excluded from the inspection process as a general rule. Whilst some Federal States implement detailed evaluation procedures, other States deploy simplified procedures in which the assurance given by a publisher to the fact that its materials conform to the require standard is sufficient. A number of Federal States in the meantime – for different reasons – entirely dispense with the approval of school textbooks (Stöber 2010).
Focus groups show that the textbook is highly appreciated by the various players. It offers teachers and students alike a rapid and simple guide as to what is to be taught or learnt respectively. It symbolises the amount of material to be covered in the course of a school year; learning progress is made tangible by counting the pages and chapters covered. It simplifies coordination between teaching staff who are involved in the same subject at the same level. And finally, procedures for the approval of «official» school books have been an instrument for the educational administration to enforce state-wide standards and curricula (Oelkers and Reusser 2008).
The increasing availability of worksheets and books, educational programmes and websites on the Internet is putting the importance of the textbook into perspective, however. In the initial phases of some projects, central educational servers have been brought forward that categorise and evaluate teaching resources extensively by editorial teams. This has essentially evolved to two procedures: educational servers adopt materials from providers of whom it generally assumes have

suitable or high quality materials at their disposal without any further examination. This corresponds to the «simplified procedure of textbook approval», without inspection that increasingly is being applied in various German states. In other cases, web resources are carefully gathered by a teacher or group of teachers on selected educational topics. Such compilations cover areas of a subject and do not raise any claim to completeness in the way in which a textbook covers the material for a school year.

A comprehensive evaluation of Internet resources for school lessons, for example on the basis of a catalogue of criteria, is to be regarded as misleading in view of the plethora and dynamism of the Internet. There are, moreover, doubts as to whether such a quality inspection would achieve results that are helpful to the teacher and say something meaningful about the educational effect of the resources (cf. Biffi 2002). In general, it seems questionable if a particular teaching material may per se be assessed as being of «a high quality» for scholastic use. The educational quality or relevance of any material may not be determined on the basis of the material itself but can only be evaluated in its usage in the teaching-learning process, the central proposition of the didactical-design approach elaborated in Kerres (2013). A multitude of sources on the Internet have not been specifically developed as teaching or learning materials but may nonetheless be, for example, used as raw data, sources and authentic materials in lessons.

Alternative approaches for the quality assurance of learning materials arise when teachers (the users of the materials) themselves are included in the evaluation. This approach is applied in the reference platform «Edutags» and described in more detail in the following section. In the context of Web 2.0, mechanisms have been developed by means of which users may be actively involved in the evaluation of content and the collaborative development of knowledge (Kerres 2006). This approach is achieved by processes in which users themselves produce and deliver materials, provide tags and keywords and evaluate them. In the case of a larger number of users, it is also possible to provide information by way of indirect procedures that are based on user behaviour, e.g. it may be indicated which materials are called upon more frequently, and recommendations can be given as to which materials might also be of interest, as the system can deduce the similarity of materials from the behaviour of users. Editorial teams are still needed for the important task of intervening in case of incorrect allocation or questionable contents.

When teachers are looking for materials on the Internet they can quickly find many resources. They complain, however, that it is a tiresome and time-consuming process to find the *right* material from the huge amount there is to choose from. This process can be simplified if keywords and evaluations from other peers are provided with the materials («social tagging» or «social bookmarking»). Teachers

collect references to materials and furnish these with metadata which do not conform to a prescribed taxonomy but are given by the users as free keywords («folksonomy») (Marlow et al. 2006).
This context offers a new approach to quality assurance of learning materials that is based on users' inputs. As the number of users increases, a knowledge base is created which helps to retrieve learning contents more efficiently and increasingly find them more easily. The problem is that in the beginning, when only few users have provided tags and evaluations, the platform is not very informative for new users and, hence, a critical level of inputs provided must be ensured (Bertram 2009, Peters 2009).

Legal aspects

Many sources may be found on the Internet that may be used for learning and teaching purposes. At the same time many teachers are uncertain as to the framework conditions under which this is possible because not everything that may be found on the Internet may also be used in lessons. German copyright laws protect the owners of intellectual property and the rights they have in connection with the exploitation of their works. At the same time society's demand for free access to knowledge for educational purposes is to be honoured. In the case of schools, current copyright laws therefore have limits that allow teachers to copy parts of educational works and to pass them on to their pupils. The terms of use may, however, explicitly rule out making such copies available in *digital* form or on school servers (UrhG *(Copyright Act)* 52). Should a teacher wish that pupils work with digital materials, alter them, integrate them in works of their own, and make them available to others in digital form, many materials that are available on the Internet, even if they may be accessed by the learners free of charge, may simply no longer be used for legal reasons.[1]
These legal framework conditions are a burden to many teachers, particularly as it is not easy for them to recognise which form of usage is allowed, and which is excluded in a specific case. It is not very practical when several pages of terms of use must be read through merely to determine the manner in which, for example, a worksheet may be used in a lesson. It is for this reason that, in the international discussion pursuant to educational materials the so-called «Creative Commons Licences (CC)» have been accepted as an instrument with the help of which

[1] The legal pointers on the State Educational Server of Baden-Wurttemberg could serve as an example of this: «The sites may only be copied for private usage and, inasmuch as no third party rights are affected, made available to the public for viewing and use in non-commercial educational institutions, thereby quoting the sources, to the extent to which this is justified in connection with the respective purpose and the pursuit of non-commercial purposes. Online-input, alterations or further-reaching, in particular commercial, usages are only permissible if prior written consent is granted.» This makes it clear: the contents may be used in lessons, but not posted online or altered in any way. It is assumed that online-input also includes usage of Learning Management Systems.

permitted usage variations may be communicated quickly and easily between producer and user. The CC-licences are made up of several components (e. g. usage demands the naming of authors must be forwarded under the same conditions, may not be processed, may not be distributed for commercial purposes) that the producer adds to the content by way of appropriate identifiers.

In addition to the CC-licences, other adapted licensing forms may be selected in order to characterise usage rights for teaching purposes. The terms of use of the Statistisches Bundesamt[2] (Federal Statistics Office) and of the online service for educational media of the media centres in NRW (EDMOND)[3] are hereby cited as examples. The Federal Office allows (independently of the context) forwarding and copying, but reserves for itself the right to alter the data. EDMOND, on the other hand, also permits alteration and processing in the school context along with digital forwarding, but not the publication of these altered products. From their context both regulations are understandable. The two examples cited make it clear that web resources are not teaching contents per se. Whereas EDMOND's offer is directly aimed at educational institutions, the target group for the Federal Statistics Office is significantly larger. The data stored there only becomes educational material when used in lessons.

There is some controversy in the discussion about OERs as to the characteristics that qualify an Internet source to be categorized as an «Open Educational Resource.» First of all, the question is asked whether «raw data» are to be regarded as OER or whether a certain degree of didacticism is required in order to count as an OER (Bretschneider 2012). This in turn raises the question of whether materials that have been created outside the context of an educational institution may be described as OER (DIPF [German Institute for International Educational Research] 2013). And finally, a further matter of controversy is whether a certain type of licence is mandatory for «Open Educational Resources.» Is it sufficient simply to make these resources available free of charge or is the permission to process and publish the material again connected herewithin? Must commercial usage also be possible or may this by excluded? And, where and/or when does the usage of the resource in educational contexts represent commercial usage (Klimpel 2012)?

As it is possible to differentiate between web resources from the perspective of usage thereof a teaching/learning context is as follows:

- Contents that have been produced and published as teaching – learning material and are identified by way of a licence as OER
- Contents that have been produced and published as teaching – learning material and are furnished by their creator with an individually worded usage agreement that describes their possible usages in an educational context.

2 https://www.destatis.de/DE/Meta/Impressum/Impressum.html.

3 http://www.medienzentrum.schulministerium.nrw.de/Edmond/nutzungsrechte.htm.

- Contents that have been produced and published as teaching – learning material and which have not been placed under a particular licence. To these, the limitations of the copyright laws apply.
- Contents that have not been produced and published as teaching – learning material but which are described by way of a generally comprehensible licence as free contents.
- Contents that have not been produced and published as teaching – learning material but which are subject to individual terms of use that clearly define the framework for that usage.
- Contents that have not been produced and published as teaching – learning material and which have not been placed under a particular licence. To these, the limitations of the copyright laws apply.

Thus the spectrum of «Open Educational Resources» is made clear, as well as the fact that a definition seems almost impossible: «Open Educational Resources» may only be defined as being resources that are available via the Internet freely (without any further obstacles) and may be retrieved by the users free of charge. The usage of a generally comprehensible licence according, for example, to the CC-licence, is thereby a considerable aid to usage in learning contexts, but cannot be phrased as a necessary condition for an OER. These must conform to the valid legal stipulations of a given country and should be simple to communicate. This also corresponds to the definition of OER that Atkins, Brown and Hammond (2007) provide.

It should also be taken into account that legal interpretations do, in part, fundamentally differ in different cultures and countries. For example, the release of a resource waiving copyright laws in the «public domain», possibly in the United States, is incompatible with German copyright laws. It was not until 2010 that a judgement passed according to which the CC-licences – in contrast to other forms of licences that one comes across in an international context – were considered compatible with German case law.[4]

Costs and business models

In the focus groups, members of the teaching staff express the concern that, in the context of the increasing commercialisation of the Internet, certain high quality teaching-learning resources may only be accessible in the future against payment potentially. It is important to teachers that they should be able to have access to «Open Educational Resources» (OER) for school.

Learning materials, as well as the educational infrastructure for learning, have always been financed by various players. School equipment, including networks, computers or beamers in Germany are mostly to guaranteed by the municipality. Textbooks,

[4] Regional Court of Berlin, Ref. 16O 458/10 dated 8.10.2010.

which are primarily loaned to students, are also financed by the municipality; in most cases extra payments are to be made by parents.[5] In addition, parents have to finance further materials of general use and exercise books for lessons, for example, those materials that accompany or supplement an «official» textbook. Opinions differ as to whether digital educational resources can be counted as an «official» textbook, structuring the lessons over a school year. Whereas in NRW only approved school textbooks are financed by the municipality, Thuringia also includes educational software that substitutes for traditional textbooks in its range of free teaching materials.[6] Usage licences for media that are provided by way of a State educational server or a State video library or media centre are, generally speaking, financed by the state.

This makes it clear that there is a fundamentally mixed financing system for educational infrastructure and media in schools in Germany, as in in most other countries. Essentially, the crucial question in the discussion about «Open Educational Resources» is whether students should pay to use the medium or whether this use should be financed by others. The development, provision and quality assurance of educational resources is never free from costs. We may therefore also assume that in the future there will be a mixed financing system; the only open question remains as to who is to bear which parts of these costs and where the focus of state financing should lie in the future: still only on traditional textbooks or should it include other resources or elements of the educational infrastructure?

The choice of cost model has an impact on the pedagogical work. If payment relies on the frequency of the retrieval of materials («pay per click»), this would influence the planning of a lesson. A school or a teacher could, for example, be compelled to reduce the number of retrievals, if the quota of clicks that has been purchased has been used up. Cost models that rely on billing the individual access thereby do not appear particularly practicable, or, from a pedagogical point of view, particularly sensible in regard to learning and teaching in schools.

It would therefore appear far more expedient to develop material pools that teachers and students can access openly. In order to establish material pools as «Open Educational Resources», procedures are required as to how these resources can be produced and made accessible using funds that have been previously used for traditional textbooks. Teachers can and will help to build such a base of open learning resources by sharing their materials. Additionally and more importantly, the experience of publishers in producing materials of high quality can be used to implement a wide range of «Open Educational Resources.»

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5 In NRW, for example, schools may pass up to one-third of the costs for textbooks on to the parents (§96SchulG (Schools Act) NRW).

6 Thuringian Decree on Educational Resources (ThürLLVor §12, Para.2).

We may summarise the results of the work with focus groups in the «Edutags» project as follows: Teachers have a high demand for quickly finding high quality educational materials on the Internet for teaching in an efficient manner. They use the materials in lessons mainly in paper form, but wish to make them increasingly available to their students digitally, if legal conditions are resolved, and if no additional costs are incurred by students or the school. They do not wish to be bound to individual providers but want to be open to various providers and to also make their own contributions to the further development of learning materials.

Digital Educational Resources as a Component of the Educational Infrastructure in schools

Digital educational infrastructures are increasingly complicated entities in which many components must necessarily interact with one another: from the furnishing of the buildings and the IT hardware components to applications and platforms that are operated by various commercial and state institutions. These components must be technically and conceptually compatible with one another in order to be able to be integrated effectively into the teaching–learning context. In addition, a number of services, from installation, maintenance and upkeep, to consultancy and training, are necessarily if these are to be used successfully (Kerres, Heinen and Stratmann 2012; Kerres and Heinen 2013).

School, Content and Reference Servers

Beginning with the analysis of the conditions for the usage of digital educational resources, the question is examined as to how an informational ecological system is to be shaped that corresponds to the requirements of scholastic teaching and learning. The concept of an «open informational ecological system» for educational resources has been thereby developed. It is based upon the idea of the interaction between various players and platforms that in the final analysis, provide the educational infrastructure. In the following discussion, school, content and reference platforms are examined as components of such an ecological system.

- School Platform

A teacher develops materials for his or her lesson or searches for materials on the Internet. He or she then posts these materials to a learning management system so that the students can use them. Learning management systems usually take the form of a school server run by the school itself or provided by a host (e.g. Moodle, Fronter, LoNet or similar provider). The school platform offers students a central location where they can find relevant documents for learning activities. School platforms serve the purpose of distributing learning materials. The students do not necessarily work with these materials «within» the school platform itself (Petko

2010). For this purpose, the students mostly use other tools in their personal learning environment (PLE). In this sense, learning management system are also to be regarded as social hubs that connect the PLEs of the students with the institutional platforms of the school (Hölterhof, Nattland and Kerres 2012; Kerres, Hölterhof and Nattland 2011).

- Content Platform

Teaching and learning materials are available on various platforms (in Germany e.g. Lehrer-Online, 4Teachers, ZUM, Educational Servers etc.). The contents are posted either by an institution, a publishing house, an editorial team or, even by users themselves (usually teachers). Generally speaking, metadata pursuant to the resources are entered in order to enable the materials (at least within the respective platform) to be found more easily . A number of different standards exist for these learning objects and metadata (Weibel 1998; IEEE 2002) that , despite intensive endeavours, (Van Assche et al. 2009) have not led to a uniform standard. There is also some criticism that these standards are not flexible enough and say little about the actual potentials of educational objects in classrooms (Brooks and McCalla 2009).

In any case, expenses are incurred for the operation and supervision of the platform, which can be collected differently depending on the business model. As has already been mentioned, the users themselves can cover the costs by an annual subscription (similar to a magazine) or they may «pay per page» similar to a loose-leaf binder, or the costs may be borne by another party, be it private parties or institutions that may be active on behalf of a school governing body or a Federal State. Some content platforms are be operated e. g. by institutions, companies or associations.

These platforms can offer a wealth of materials for use in the classroom. Most often, they complement learning by way of an «official» textbook with exercise materials of all kinds. The «official» textbook contains a linear-structured and closed collection of didactically prepared material that is based on the curriculum for a school year and school type. An increasing number of publishers are producing digital textbooks that have a number of advantages when compared to traditional textbooks. For example, digital textbooks are often conceived as documents, for example, in PDF-format, provided for reading on a laptop or tablet. Then, searching and navigating is easier in a digital document; texts and images may be more easily annotated, managed and commented upon. Digital documents can also integrate multiple forms of multimedia and interactive exercises. Döbeli Honegger (2012) discusses the future potential for textbooks as a consequence of digitalisation.

Publishers are beginning to build online-platforms around their digital textbooks that are made available to classes and courses that work with particular textbooks. Increasingly, rich online-environments with diverse materials are being set up for this purpose. Teachers are provided with various presentations and templates for examinations and tests. If the print-based textbook is available in a digital format and finds its way to the Internet, the transition to other content platforms becomes blurred. The question remains as to the direction in which the digital textbook will finally develop, whether it will become a document with embedded and extended (multimedia) interaction or an online-platform with a multifaceted pool of materials and an online-learning environment for courses based on digital textbooks.

- Reference Platforms

With the diversity of available materials on the Internet the question is raised as to how teachers and their students can find materials for their learning activities. The first path will lead them to those search engines that they also use in their daily activities, which will presumably guide them to one of the above-mentioned content platforms for learning materials. Should they already be familiar with such a content platform they may possibly take the second path and search directly within the content platform itself. This type of search is restricted to materials on that platform or, to put it another way, it will be necessary for the teacher to conduct the search on a number of platforms consecutively. They may, however, also take the third path and search for materials on an educational platform that brings together references to materials to be found on a platforms of several providers. In this case, the reference platform merely *points* to materials on a content platform, but does not, as a rule, provide materials of its own.

Reference platforms may be filled with content in three ways:

(1) Editorial Maintenance: An editorial team looks for materials on the Internet and posts references to these materials, usually furnishing them with keywords and / or allocating them to a taxonomy (e.g. according to school year and subjects). This corresponds roughly to the practice adopted by some state educational servers or the core service offered by the Federal Educational Server.

(2) Automatic Aggregation: So-called «crawlers» comb their way through the resources on associated content platforms and register any newly posted materials. These crawlers analyse the contents and attempt to classify them automatically, or furnish them with keywords that may be extracted from their contents.

(3) User-generated Content: The users themselves enter references to valuable educational materials, assess these and provide keywords. On the basis of previous search inquiries and keywords used, the platform is able to make recommendations for further materials.

Some states' educational servers are websites operated by editors, for example, that are supplemented by automatic aggregation. User-generated content often is to be found on websites that are run by teachers themselves. The German national educational server offers a mixed form. Alongside editorially maintained content one also finds – with «Edutags» – a reference system that points to educational resources provided by users. Finally, a crawler automatically reaches out to check the resource and reads available attributes of the resource, inasmuch as this is possible.

Interaction between the Platforms

To describe the full picture of a learning infrastructure platform , beyond school, content and reference platforms,. repositories, portfolios or systems for assessment or administrative purposes should be included. In any case, it becomes evident that the successful and sustainable provision of educational resources beyond the scope of a single school is not a trivial matter: the mere posting of a resource on a server cannot guarantee that the materials, –often compiled with a great deal of effort, will be reliably found and integrated into classroom learning. There are several obstacles to be overcome from the production of a learning resource by a teacher including the uploading onto the «right» platform and the usage by another teacher in another school. (not sure I understand why the latter example is an obstacle?)

The complexity of this workflow can be reduced to some extent if the sub-processes described are brought together in a single platform or environment. This is the approach that is to be found in so-called «closed informational ecosystems» and which is outlined in the following discussion.

Open and closed informational ecosystems

The brief overview of platforms that come into play in the provision of resources for learning and teaching demonstrates the complexity of the informational infrastructure necessary for providing learning resources. These processes can technically be grouped together and implemented on *a single* platform or on an Internet environment (consisting of several components that are connected to one another), that is designed and controlled by one provider.

A publisher may, for example, operate a platform,

- on which teachers share links to contents,
- on which available content is uploaded,
- on which content is classified and tagged with keywords,
- on which content is reviewed and processed where necessary,
- on which other teachers search for content, comment and evaluate them and finally

- copy this content into a course shell in which
- students learn from these materials.

An approach of this kind can provide a coherent and uniform environment. From the provider's point of view, the environment can tie teachers and students to the platform. In such a closed environment, all aspects of the ecosystem can be controlled by a central agent, not only the contents, but also the hard- and software components for viewing and processing these contents. Such a «closed informational ecological system» for the provision of educational resources has far-reaching implications and social consequences beyond education and learning in schools. It is, finally, a question how the production and dissemination of knowledge should, could and must take place in an open society.

A closed environment of this kind can offer many advantages to the individual user. The «vendor lock-in» effect does, however, result in a dependency that is, perspectively speaking, problematic for a society that is dependent upon the free development of and access to knowledge. From the perspective of education such an aggregation of knowledge in «closed informational ecological systems» must be regarded as problematic. It can be seen as a significant cultural achievement that knowledge is available for education that belongs to everyone and that education, as a state duty and civil concern, is borne by everyone. The commercialisation of the Internet could bring a closure to knowledge platforms in the long term without the far-reaching effects and implications for the individual user being available in the short term.

Yochai Benkler (2002) coined the concept of «commons-based peer production. The origin of the Internet encyclopaedia revealed the possibilities that may be linked to a commons-based production of knowledge where individuals contribute to a work that is the property of «all.» However, in most cases there are a relatively few number of users that actively contribute and share their knowledge contrasted with a large amount of users who «consume» these resources and do not actively participate in the knowledge building.

Aigran (2012) refers to Doueihi (2009) and a new form of «digital humanism» which feeds off three factors: a) already existing knowledge and infrastructures that are used and shared jointly, b) the ability of each individual to make a contribution to the pool of world knowledge, and c) tolerance to gaps in knowledge and lack of knowledge accompanied by the endeavour to compensate for this as much as possible. A commons-based peer production of knowledge must guarantee that each individual may make a contribution to the body of knowledge from anywhere, some tools and resources must be available for the functioning of the project, and it must be possible that the results of this process are available for others. (Aigran 2012).

The concept of open informational ecological systemscan be directly derived from this. It is an environment that is open for a commons-based production of knowledge resources by peers, whereby the participation of commercial producers is not ruled out. In the context of projects such as Wikipedia, it also becomes clear that the provision of «open resources» does require a rather sophisticated technical and social infrastructure, as well as financial means.

«Edutags»: A Reference Platform for Educational Resources

In the following discussion, the significance of a reference platform as a basic technology for an open informational ecological system will be explained in more detail. «Edutags» is a reaction to the problems described above; it uses the assignment of keywords to educational resources as a measure of the quality assurance of these resources. Also, the importance of providing licence information for educational resources is highlighted.

Keywords for the Description of Educational Resources

«Edutags» contains a platform on which teachers create references to web resources of all kinds that they deploy in an educational context. Teachers describe these resources by way of keywords (tags) and other information. The choice of keywords is the prerogative of the users. Terms from a subject-specific list of keywords as well as other terms based upon individual criteria of a single person or group may be assigned. The decisive factor is that users, by way of assigning keywords, illustrate and reflect their own concepts pursuant to the resources (Kimmerle, Cress and Held 2010). These tags do not represent a complete set of metadata but do offer descriptions that relate to the actual use of the resource by a teacher in a «real-life» context. If several users assign keywords to a resource, the describing metadata becomes more substantial, and the resources can be found more easily by other users (Weinberger 2007; Ihme, Möller and Pohlmann 2009, Richter and Ehlers 2010).

In contrast to other reference platforms, it is possible in «Edutags» to store not only materials that have been explicitly defined as teaching materials, but also all other kind of materials, for example, from platforms like YouTube or Flickr. The important question is whether and how an Internet resource is used in a classroom context by a teacher who creates such a link to a resource.

Allocation of Synonyms and Classification within Hierarchies

A widespread problem with «free tagging» by users is that several keywords (tags) can be found for one concept or resource. This can make it difficult to find some resources and some valuable resources might remain undiscovered. Such a «folksonomy» is not aware of any relationships between the individual terms and

does not order them in a hierarchical structure like a taxonomy. Such a hierarchical structure, however, is very important, especially for school contexts. «Edutags» addresses both of these deficiencies: Synonyms are allocated to one another and to other keywords. Both of these measures contribute to an improvement of search results.

Identification of Licences

Teachers should immediately be able to recognise the legal conditions of how a certain resource may be used in their classroom. In the best case, this information is incorporated into the source code of an Internet resource so that this can be automatically deciphered by «Edutags.»

For each resource, «Edutags» checks the resource on the target platform to test whether a machine-readable licence is provided with the resource. In case a CC-licence is provided the appropriate licence tag and pictogram will be presented in the description of the resource. Furthermore, in order to raise the awareness of free materials and to give greater publicity to existing OER materials, providers of CC-licensed materials can input these materials to «Edutags» directly via standardised interfaces (RSS-Feed, Meta-Keywords according to LOM, LMR, or similar. In this way «Edutags» complies with demands made in the UNESCO Paris declaration (UNESCO 2012) and supports the Germany act (D'Antoni, 2009).

Interfaces to Use in Lessons

A teacher who compiles web resources as a result of a search inquiry on «Edutags» intends, as a second step, to make these resources available to students. To this end, «Edutags» offers four interfaces. Results lists may be issued as PDF files, printed out and distributed among students, they may be embedded as a tag cloud or list on websites and LMS or passed on as an RSS-Feed. These tag clouds and RSS-feeds do not only reflect current search results but are also dynamically generated and enhanced by information added at a future date. «Edutags» thus represent a link between various content platforms and content providers that may be used as educational material and the schools' learning platform. As a result, teachers profit from resources that have been shared by other teachers.

Summary and Conclusions

The analysis of the framework conditions for the use of educational resources in school contexts has revealed a number of aspects that are of particular concern to teachers. Teachers wish to be able to quickly access a large number of high quality (quality-assured) materials that they may use in their lessons free of charge and without any legal problems. At the next stage, the interaction between the players and their offers or platforms has been investigated. It was revealed thereby that

only an «open informational ecosystem» redeems the demands of approaches for open learning as well as other pedagogical criteria.

Our position is based on the observation that despite the availability of a vast amount of open and free resources for learning and teaching, closed informational ecosystems are currently affecting the development of open educational resources. Thus, we do not only need more open educational resources to support open learning, we also need to establish an open informational eco-system that sustainably supports strategies of open learning.

Our argumentation can be summarised as follows:

– Access to a multitude of digital educational resources is a pre-condition for learning in which the search for assessment and processing of digital information is an important component of learning. It is always of urgent necessity when it is a question of the individual and cooperative confrontation with knowledge from multiple perspectives in which the students make active constructive contributions.
– Digital educational resources may be made available for learning in various forms. They may be provided by commercial companies such as textbook publishers or developed and/or provided by private or state institutions.
– There are different types of licences with which digital educational resources may be used in schools. Some licences merely permit a reference to be made to a resource, others open up far-reaching possibilities of modifying and distributing a resource that has been processed. In the case of materials that have not been licensed the restrictions imposed by copyright laws take effect.
– «Open Educational Resources» is a term referring to educational materials that are available to teachers and students free of charge. This includes variants of different ranges within which they may be approved for use.
– CC-licences are an instrument which helps to easily communicate which usage variants have been granted pursuant to a specific educational resource. They are, however, not the only variant for the licensing of «open» educational resources.
– The compilation and distribution of educational materials is always connected with expenditure. In the case of «Open Educational Resources (OER)» it is essentially a matter of the students not paying for access themselves, but of another institution covering such costs. To this extent, the discussion of OERs is essentially concentrated on business and operating models for the provision of educational resources. Commercial providers may also provide OERs, if alternative ways of covering the costs are available.
– Closed informational ecological systems for educational resources provide content and offer schools a complete and (often) convenient environment for their teaching and learning activities. They are thus able to create a coherent

and consistent environment for learning, however, these systems offer little systematic exchange with external platforms and resources.
– Open informational ecosystems create an environment for community-based production of knowledge by peers, where resources and services of various players may be bundled together. Through exchange formats, interfaces and services, these ecosystems ensure that their platforms cooperate.
– Content is only turned into educational resources by active use in a teaching-learning context. The active participation of users in collecting, tagging and evaluating content, as well as providing metadata, are important means for quality assurance on the Internet.
– An essential component of an open informational ecological system is the availability of an independent reference platform that is open to all providers of content on the Internet. This should be managed by contributions from users, automatic searches and recommendation mechanisms, as well as from an editorial staff.
– Access to the diversity, dynamic, and the openness of knowledge is a central prerequisite of education. Open informational ecological systems in which various players and platforms are incorporated are an essential condition for future education in general. «Open Educational Resources» are thus dependent upon open informational ecosystems.

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Themenheft Nr. 24: Educational Media Ecologies

Visual Storytelling in Career Counselling – An Ecological Approach

Heinz Moser and Thomas Hermann

Abstract

In this paper, we present the concept of the project «Visualized vocational aspirations: Potentials of photography for career counselling and vocational preparation», which is funded by the Swiss National Science Foundation. The research project is a cooperation between the «Zurich University of Teacher Education» («Pädagogische Hochschule Zürich») and the «Laufbahnzentrum» (Centre of Vocational Counselling) Zürich. Vocational education often is largely language-based, which could be a problem for the lower achieving students. Visual stimulation could be a means to support the learning process of this group of at risk learners.

An ecological approach of narrative career education

First of all, the idea for this project came from media educators at the Zürich University of Teacher Education. We felt that for young people of the 21st century the field of vocational or career counselling is embedded in an environment where media play an increasingly dominant role in the development of lifestyles and the behavioural patterns of individuals. The planning of their lives and their vocational aspirations are not independent from the emergence of a society in which computers and audio-visual media define new cultural lifestyles. In our project we want to encourage activities in which media play a more important role in the process of career education (taking photographs, illustrating career aspirations, digital storytelling etc.).

In the past the paradigm of counselling usually was based on vocational tests as the main instrument of an analytical assessment of the client. In recent decades Mark L. Savickas has advocated a change from the «scores» to the «stories»: «From this perspective, a subjective career is a reflexive project that transforms individuals from actors of their career to subjects in their own career story» (Savickas 2002, 152). As a consequence postmodern approaches are including step-by-step communicative activities and methods such as storytelling in the process of counselling. Mary McMahon explains: «Thus counsellors engage as co-authors with the storytellers in ‹negotiating stories that must take into account both the individual's life and the ecological context›» (McMahon 206, 17). In this constructivist approach counselling processes are interpreted in a holistic view of individuals as being contextually located.

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In light of these developments in career counselling we found it useful to reflect about connections to the concept of media ecology as it is expressed by a definition of Lance Strate: «It is the study of media environments, the idea that technology and techniques, modes of information and codes of communication play a leading role in human affairs» (Strate 1999). This definition shows that in this approach, the technological aspects of media are embedded in a communicative or an environmental setting. As Larry Sullivan writes in the SAGE Glossary of Social and Behavioral Science, «Media Ecology is best understood as an approach, rather than a strict ideology, to understanding the media as environments. Central to media ecology is the idea that media environments, such as books, radio, film, television, and the like, involve subtle, implicit, and informal dynamics and complex message systems» (Sullivan 2009, 315). In our project, the connection between image and narration should be expressed by taking photographs that capture the wishes and aspirations in the vocational field.

Overcoming the conservative bias of media ecology

The point made in the SAGE Glossary that media ecology should be more than an ideological approach is very important, because one of the founders of the concept of media ecology is Neil Postman: For Postman media ecology is a means to look at how media of communication affect human perception, understanding, feeling and value. And he is interested in analysing how our interactions with media facilitates or impedes our changes of survival (Postman 1970). In his keynote address at the inaugural Media Ecology Association Convention from 2000 Postman comments frankly: «From the beginning, we were a group of moralists. It was our idea to have an academic department that would focus its attention on the media environment, with a particular interest in understanding how and if our media ecology was making us better or worse» (Postman 2000, 11).

As we know, Postman is not only a moralist but also takes a conservative position on media education. He argues against television as a medium, warning that we are «amusing us to death» (as one of his bestselling books is titled). He tries to demonstrate how the content of the printing press in America was once, ‹coherent serious and rational› and how, under the governance of television, it has become ‹shrivelled and absurd› – equally absurd as the TV content that have destroyed the traditional childhood.

If we refer in our project to the concept of media ecology, we are not following this conservative path. Reflecting the influences of the media does not mean that we are criticising their influence on vocational choices – for example the influence of casting shows or role models and idols. And we are not discussing the fact that lifelong vocational activities today have often been replaced by short-time jobs.

For us, it is more important that media will be seen in media ecology as a complex message system, linking human beings with media, social relationships and per-

sonal feelings and emotions. The media system is a very important factor in the interplay of these elements and their linkages; it structures – as Postman noticed – what we can see and say, and therefore, do. In a similar way McLuhan speaks of the media ecology as the way in which media change our perceptions of the world. Media ecology has taken up the task of detailing some of the many ways this has happened and will continue to happen as new media like computers, internet and Facebook are influencing our lives (Levinson 2000, 17). It is «synaesthesia», the balanced interplay among all of the senses, which is the effect of hypermedia. «Hypermedia» in this sense are part of the contemporary digital culture. We agree with James C. Morrison's statement: «Here, I am referring not to a collection of media that might be invoked with hyperlinks. Rather, I am referring to the system of interlinked communications itself, to hypermedia as a means of linking both textual and audio-visual files» (Morrison 2000, 38).

Career counselling – a postmodern approach

Looking back to the field of career counselling as an approach, based on central concepts of media ecology and «synaesthesia», we developed a framework, involving the following key-points, to be adopted in our project-strategy:

1. Career Counselling is not a technical process where the counsellor searches for information by testing and interviewing in order to develop a rational decision for his clients. In contrast to such approaches counselling has to be described as a communicative process. Vance Peavy (1997, 84) assumes that dialogical conversation is a form of communication, which seeks common ground and does not foster the superiority of the counsellor.

Both are a part of the same common life-space. For Peavy this is the ground where the psychological and the sociological spheres meet. In these spheres the individual actions, values and knowledge are inextricably linked together (Peavy 1997, 78). Counselling should become a collaborative activity, in which the client participates actively in the search for his vocational future.

2. The coherence of the identity in social life is kept alive by stories, which give us a sense of ourself, of personal comfort and stability. As Peavy notices: «A person needs to have a coherent life story, which is constantly being revised as she moves through live» (Peavy 1997, 97). All the choices a person has to make in vocational counselling, thus, are embedded in activities that are linked to her or his own life stories. As a consequence storytelling as a method of counselling is a key-concept of our approach. Working with stories in school should help young people to clarify their vocational aspirations.

3. If we give practical expression to these essential characteristics of career counselling in the digital age, it is necessary to have in mind the situation of the youth. The minds of young people – our clients in career education – are deeply shaped by

the influences of media. As digital natives they are born into an environment where visual stimuli are much more present than in the age of the traditional literacy. In this visual culture, understanding can be better reached if it is embedded in a learning environment which does not exclude visuality and synaesthesia as the interplay between the textual and the audio-visual. For this generation, stories are not only linguistic experiences but also imaginational expressions in the context of a visual culture – for example in cartoons, television series, YouTube videos etc. This description of the theoretical concepts of our project shows how the concept of media ecology is guiding the development and elaboration of the main ideas of our project. In the next section of this paper we describe more concretely the concept of storytelling that we realize in schools.

Our concept of storytelling

The basic definition of a story as outlined by Hoffmann (2010, 2 ff.) describes a narrative as a representation of two or more events. These are linked to one another following the properties of «*narrative sequence* (chronology and causality) and *evaluation*» (ibid. 4). Hoffmann notes that this definition is «not constrained by the use of any particular semiotic mode» (ibid. 2). Thus a series of photographs can form a narrative as well as events that are conveyed through spoken or written language.

A more sophisticated narrative structure includes criteria such as complications, solutions and transformations. While it takes some time to develop such a narrative, it certainly works well in an open setting of biographical – maybe even therapeutic – self-reflection. However, for our purpose we felt that we had to keep the story-telling task as simple and straightforward as possible, considering the relatively small amount of time teachers allotted to career counselling activities in the classroom. Furthermore, one of the major aims of the project was to give lower achieving students an equal voice and we did not want to discourage them with a complex assignment. Also, students do not need to be familiarized with elements of a story, such as characters, setting and time, since they themselves are the protagonists, acting in their everyday environment or – if they so wish– in imagined professional environments, using props etc. associated with particular professional activities.

Thus, following Hoffmann's basic definition, we asked the students to produce three or more photographs of past and present career wishes (however vague they were) which they would put together in a PowerPoint presentation, usually in a chronological order, ending on an outlook into the future, i.e. showing what they were planning to do next. Furthermore, students were asked to comment on the slides for the class, explaining what jobs they fancied at a certain time of their lives and what they found fascinating about them. Thus, the students produced

two distinct narratives that are closely interwoven: (a) a visual narrative consisting of at least three photos (some students would produce up to 16 PowerPoint slides containing more than 20 photos); (b) a spoken narrative explaining their slides and photos. Standing in front of the class and talking about ones vocational aspirations also required some presentation skills.

Photographing vocational aspirations

The project focuses on the production of photos in vocational preparation setting at school. Students actively produce photos of their vocational aspirations to trigger off the reflection process. During one week, they take pictures of their own vocational aspirations. They document the fascinating aspects associated with their target jobs. Some pupils consulted their private photo albums for pictures representing their former vocational aspirations. Other students demonstrated their career-knowledge with pictures documenting typical activities of a certain job.

All these pictures were uploaded in digital form on a computer. During the next phase the students worked on their own biographical story about their vocational aspirations. To do this, they created their own PowerPoint presentations, which integrated textual elements with their pictures. The production of a kind of «vocational biography» is not only a technical challenge. It allowed the students to reflect their childhood aspirations and motivations. They construct their own biographies – a process which can help them to become more conscious of their own preferences and criteria for a career decision.

This describes the central idea of our project. For the realization of this kind of teaching and learning we prepared teaching materials. We plann to later integrate these materials in the general process of counselling in Swiss schools if this kind of visual storytelling will be successful. Therefore, an evaluation will compare this new visual approach with conventional methods of teaching.

The methodological concept

From a methodological viewpoint, this evaluation process is based on the concept of design-based research. This approach is appropriate for combining practical work with theoretical considerations. It is a kind of participatory action research where researchers cooperate closely with teachers. But unlike in action research, the theoretical foundation of the research process remains an indispensable element of the research process. As Wang and Hanafin write, design-based research can be characterized by five basic elements: It is (a) pragmatic; (b) grounded; (c) interactive, iterative, and flexible; (d) integrative and (e) contextual (Wang, Hanafin 2005, 7).

On the other hand this kind of research is orientated on concrete steps of social action. It is «grounded in real-world contexts where participants interact socially

with one another, and within design settings rather than in laboratory settings isolated from everyday practice (Wang, Hannafin 2005, 9). This strong emphasis on practical change is related to the German concept of «Praxisforschung» (Moser 2012).

As in action research (see Moser 1974) design-based research is also characterized by an iterative cycle of five tasks: design, enactment or implementation, analysis, and redesign. We began our project (I) with some theoretical considerations about the visual society and function of storytelling. At the same time (II), we discussed the actual situation of career counselling in schools with our project partners from the Centre of Vocational Counselling and the colleagues who are teaching career counselling at our university. Then (III), we developed an educational concept grounded on taking photos and producing PowerPoint presentations for the teachers who are willing to cooperate, which is. These were presented and discussed in class. After (IV) conducting the lessons of visual storytelling in the classroom we evaluated the results and drew conclusions (V) for the redesign of the teaching materials. The entire design with its five steps was piloted with three teachers and their classes in order to optimize the procedure for the larger study.

The main study group included eleven teachers with their classes in the German-speaking part of Switzerland who were interested in the concept of visual storytelling. We will compare this group – a kind of «experimental» group – with ten other teachers who taught this subject in a more conventional way. The latter function as a control group. In a cyclical model of research this part of the evaluation is crucial. The results will be integrated into a textbook for career counselling at school.

A mixed-methods approach was selected for the main study. First, we conducted online interviews with the students of the 21 classes (experimental and control). The interviews were done with the online-tool «Surveymonkey» – with particular focus on general questions concerning the students' career plans. Some specific questions on the visual storytelling experience were posed only to the experimental group in order to evaluate the visual project as such.

Second, we observed and filmed the presentations of the students in their classrooms in order analyse the narrative structures of their productions. As a further focus we will analyse the visuals produced by the students.

Third, group interviews with the participating teachers were carried out after the project in order to gain further information on its success or failure.

First results

The results from the trial phase were encouraging. Students reported that they enjoyed producing the visual story. The actual presentation in front of the class was considered as more challenging, yet rewarding. The three piloting teachers

reported that the students were highly motivated to produce stories of their past and present vocational aspirations for the future. One teacher was surprised that the project shed a new light on some of his students. «I was able to see a few students from a new point of view». Another teacher stressed the fact that the project involved parents, relatives and peers in a cooperative way. With the positive feedback from the trial phase, only minor changes were necessary for the main study.

To this date, the online questionnaires of the 21 classes have been partially analysed (11 experimental classes, N = 195; 10 control classes, N = 189). The sample included 384 students (212 males; 172 females). Their ages ranged between younger than twelve and older than fifteen years, with a majority of 12-year-olds (N = 149) and 13-year-olds (N = 113). With 191 students who reported that the language spoken at home was German and 193 students with other linguistic backgrounds, the groups of students with a Swiss or migrant background were equally large.

Figure 1 shows the acceptance of the digital storytelling project by the experimental group. A majority of the students reported that the project was fun. To our surprise taking or collecting pictures was a little less popular, while working with PowerPoint was considered more positively. Not surprising, self-exposure during the presentation was not enjoyed by all students equally. However, more than half of the students reported that they thought they had learned a lot while working on the biographical portraits and a vast majority would recommend the project.

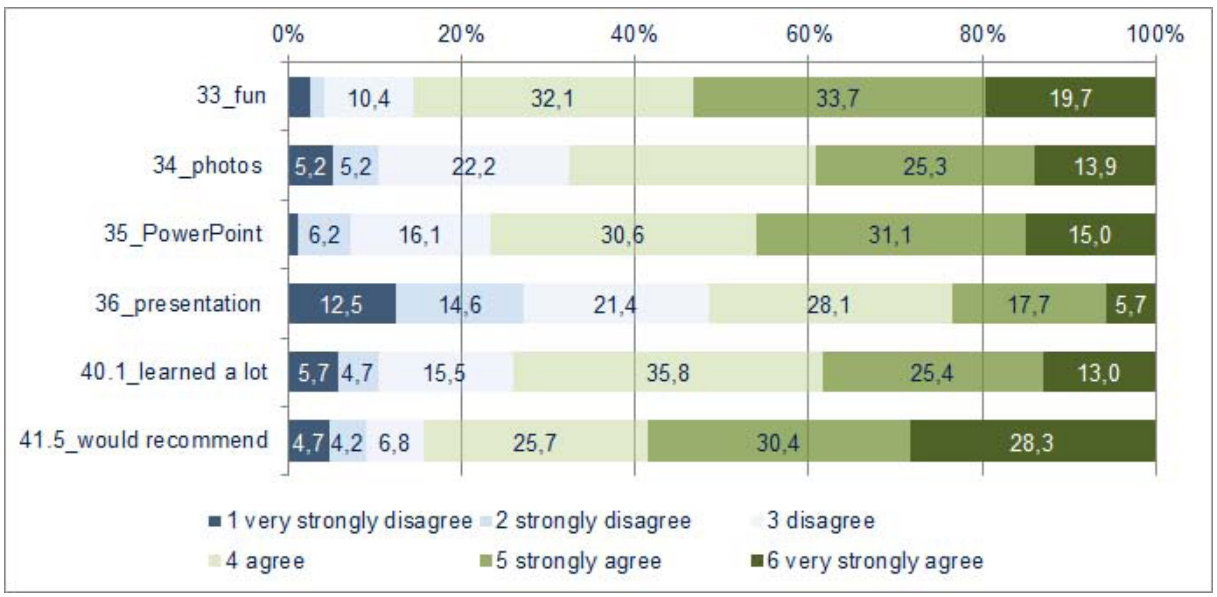

Figure 1: Evaluation of the digital storytelling project by the experimental classes (N = 195).

Differences between experimental and control group need to be further analysed. The figures seem to suggest that students from the experimental group are more open to consider new job opportunities after they completed their task, whereas their peers from the control group seem to be less flexible concerning alternative aspirations.

In terms of the concept of media ecologies, one positive result reported by several teachers is that by repeating the presentations on parent-teacher-conferences, parents were (a) extremely positive about the project and (b) began to cooperate with their children and the teachers on the issue of career planning and counselling. Also, the presentations stimulated conversations among peers. Thus, the digital stories produced by the students provided a media environment with a potential to reach and involve several stakeholders in the process of career education and decision-making.

The visual and verbal data collected during the main project are currently being thoroughly analysed. Results are expected towards the end of this year (2014).

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Themenheft Nr. 24: Educational Media Ecologies

Education, Media and the End of the Book

Some Remarks from Media Theory

Rainer Leschke and Norm Friesen

Abstract

This paper sketches out an understanding of contemporary educational forms and practices from a vantage point afforded by recent German media studies. In so doing, it introduces a number of concepts from continental media theory. With the book – both as an artifact and an epistemic metaphor – in evident decline, what is taking its place is not any one new medium, but rather a radically new kind of media systematicity. By relentlessly reducing all content (e.g., music, film, text) to ones and zeros, digitization effectively erases the material characteristics of separate media forms, leaving behind only their conventionalized aesthetic qualities and forms. The paper builds on these arguments by concluding that the symbolic competencies which once constituted the core of all education (reading, writing, 'rithmatic) are increasingly at odds with performative and stylistic abilities integral to this new mediatic order.

Introduction

All cultures are interpenetrated and structured by their media. From the drum languages of West Africa through medieval manuscripts to today's global digital networks, media *mediate* culture, shaping social relations, both in terms of what is communicated and how such communication occurs. All cultures are in this sense media-cultures, and it further follows that all forms of involvement with culture, including educational and formative participation, are unavoidably also engagements with its media. Becoming part of a culture, opening up new cultural horizons, and developing and problematizing these further, are all processes that are mediated through media. To be able to reflect on the mediality[1] of cultures can consequently be seen as one of the most elementary forms of reflexive cultural engagement.

Processes of education and formation, from formal schooling to techniques of self-help, represent forms of engagement with one's culture and with oneself that are always also engagement with the particular mediality of cultural communication. The study of culture has long ignored the significance of media in this sense. Instead of examining the production, circulation and remediation

1 The chapter uses a vocabulary of «mediality» and «mediation» that is introduced in Norm Friesen and Theo Hug, «The Mediatic Turn: Exploring Consequences for Media Pedagogy.» In *Mediatization: Concept, Changes, Consequences*, ed. Knut Lundby, 64–81. New York: Peter Lang, 2009.

Leschke, Rainer, und Norm Friesen. 2014. «Education, Media and the End of the Book: Some Remarks from Media Theory.» *MedienPädagogik* 24 (3. Okt.): 183–196. https://doi.org/10.21240/mpaed/24/2014.10.03.X.

of the Victorian novel or the Elizabethan theatre, for example, it has tended to study «Dickens» or «Shakespeare», as if the mediatic and material nature of their cultural production was either invisible or tertiary. This forgetting of media and mediation (*Medienvergessenheit*) has applied not only to the conditions of culture and its appropriation, but particularly to the close connection of education and socialization to media. Socialization and conscious self-formation are not only medially mediated, but have this condition of mediation itself as a subject of conscious reflection. Understanding processes of formation in and through media is dependent on understanding media themselves – their theory, analysis, history, and aesthetics.[2]

This paper represents an initial foray in this direction. It takes aspects of German media studies (e. g., see Horn, 2008) related to media history, theory and aesthetics, and sketches out one particular way of understanding their relevance to contemporary education. In so doing, it introduces a number of notions important to theories of media that recently been developing in German-speaking Europe. Besides *Medienvergessenheit*, these include the notion of a *Leitmedium*, of media-systems, of Pierre Bourdieu's understanding of social distinctions, and also the belief that a given medium constitutes a Foucauldian «apparatus» or *dispositif*. It begins, however, by explaining the generally negative response of those in education to new media forms by developing the notion of the gradual and often conflicted integration or «enculturation» of new technologies into the social order. Like the musical *Leitmotif*, a *Leitmedium* serves as a repeating and guiding example for such a process. It acts as a standard to determine what is valuable and desirable in cultural contexts offering multiple, competing media or within complex «media-systems.»[3] The medium of the book has historically served as precisely such a *Leitmedium* in educational (and other) contexts, but its dominance as a medium, together with associated practices of reading and the traditional authority of the author, is clearly in decline. What is taking their place is not so much the characteristics of a new *Leitmedium* as a radically new and distinctly digital way of organizing media and media-systems. By relentlessly

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2 These initial two paragraphs have been freely adapted and translated from the document with the permission of the authors: R. Leschke, P. Spangenberg, and C. Tholen (2012). «Medienkultur und Bildung: Positionspapier der GfM.» www.gfmedienwissenschaft.de/gfm/gfm/index.php?NID=38 (abgerufen am 5.12.2013).

3 The history of the concept of a *Leitmedium* is reconstructed in: Ligensa, Annemone, Daniel Müller, and Peter Gendolla, Hrsg. *Leitmedien. Konzepte – Relevanz – Geschichte*. Band 1. und 2, (Medienumbrüche 31/32). Bielefeld 2009. Michael Giesecke provides in his 2002 book *From the Myths of Book-Culture to Visions of the Information Society* the following explanation: «Up to this point, every high-culture in history has chosen a *Leitmedium*. For example, the word, rather than the dance will stand at the beginning of a culture which understands itself as a culture of writing. And insofar as a culture chooses a particular medium as its totem, others are devalued and excluded. Those trained in the art of writing, for example, acquire power and prestige. Even though they would not be permitted to dance, they would be the ones to determine which types of dance and motions would be allowed and forbidden» (227).

reducing all media contents to ones and zeros, digitization brings conventional media forms and formats into new interrelationships, effectively erasing their material characteristics as separate media, and foregrounding their individual formal qualities as aesthetic conventions. The paper concludes by exploring how the symbolic competencies which once constituted the core of all education (reading, writing, 'rithmatic) are increasingly at odds with performative and stylistic abilities integral to these new media forms.

Of an Apocalyptic Tone ...

When it comes to new media technologies, educators clearly tend towards the apocalyptic rather than the utopian end of the spectrum. Strident critiques of media are still a part of the conventional «apocalyptic» tone of pedagogical discourse. This is based on an elementary reflex, to which parents and others in authority are decidedly sympathetic: The response of uncertainty and even fear in the face of that which is radically novel.

The first reflexive intervention of this kind, of which we have at least some reliable knowledge, appears to be Plato's critique of writing. It is not by chance that this critique was advanced by representatives of an educational institution, specifically Plato's academy. And that these educators very clearly privileged oral discourse as the medium of instruction has had lasting consequences. That oral discourse now serves as a common standard for media and engagement with it can be traced back to the powerful critique found in Plato's *Phaedrus*:

> Writing is inferior to speech. For it is like a picture, which can give no answer to a question, and has only a deceitful likeness of a living creature. It has no power of adaptation, but uses the same words for all. It is not a legitimate son of knowledge, but a bastard, and when an attack is made upon this bastard neither parent nor anyone else is there to defend it. (1892, 402)

Plato's negative intervention appears to have been enormously successful. Indeed it can be seen as helping to create, through negative implication, a particular ideal for media, one that is closely related to the notion of *Medienvergessenheit*. The implication that media should be as close as possible to speech (avoiding the characteristics of its «bastard son», writing) implies that any medium may be regarded as effective and positive when it is as invisible as possible: Oral communication, something so natural and ubiquitous that it does not appear to be a medium at all, is the «gold standard» by which all other media are measured. The more they, too, can approximate the adaptability, interactivity and thus the perceived legitimacy of speech, the more they disappear behind the meaning they convey and defend, the more exemplary they are as media. This further implies

that the primary pedagogical *a priori* with which media are marked is consequently a negative one: Media are defined by their self-effacement, they work best when they achieve their own disappearance. As Sybille Kraemer (2008) says, effective media are aesthetically self-neutralizing; their efficient «implementation feeds on their own withdrawal» (*Der Vollzug von Medien zehrt von ihrem Entzug*; 28).

That educational media-apocalyptic diagnoses regularly presuppose this *Medienvergessenheit* is itself often completely ignored and forgotten. «Apocalyptic» media are always only the new and unfamiliar media of others. One's own media are valorized and naturalized, and consequently rendered invisible. The characteristics of one's own privileged media are also almost completely repressed. That oral discourse is an exemplary medium, indeed that it is a medium at all is taken by Plato as so self-evident that its characteristics as a medium are immediately forgotten. One can hardly accuse Plato of single-handedly initiating that dialectic of the repression of accepted media and the rejection of those less invisible, «un-enculturated» forms. However, the fact that this gesture is repeated with astonishing regularity and frequency should give some pause for thought.

Obviously there is a close connection between this *Medienvergessenheit* and anxious aversion to new media forms. Media are first of all capable of becoming fully naturalized. As a result, they can completely disappear from our purview. Media themselves are enculturated; and as thus as a part of such a historical culture they become inconspicuous, they become an invisible part of the infrastructure of a culture as the transparent yet indispensable infrastructure of radio waves carrying phone calls, GPS coordinate information or radio programs. In the processes of the reproduction of a culture, these enculturated media are not only deployed as a taken-for-granted part of the lifeworld, their use is mediated and taught without any explicit attempts to explain and legitimate their constitution as media. Enculturated media are consequently organic constituents of processes of education and self-formation, and they fulfill this role in two senses: they legitimate themselves by making themselves invisible, at the same time, they serve as the means by which cultural goods are received, understood and reproduced.

Conversely, non-enculturated media inevitably attract attention: By virtue of their very constitution as «new» media, they appear to overtly infect cultural infrastructures, and as such appear to those invested in those infrastructures as threatening. Using metaphors of travel to characterize German culture, Hans Magnus Enzensberger once remarked that «apocalypse is a part of our ideological carry-on» (1978, 74). One could say that this baggage is more cumbersome but all the more carefully guarded in the case of teachers and academics. However in this case, the apocalypse in question is not religious or cosmic event but a cultural or more specifically media-cultural one. After all, specific incarnations of culture appear, disappear and mutate with some regularity, while the cosmos itself

remains relatively intact. And in some cases, the changes are not altogether bad. For example, the bourgeois subject, which still anchors almost all pedagogical discourse, owes its existence to one of the most recent of these changes: It emerged as the result of the printing press, and in response to corresponding changes in the structure of the public sphere.

Education, however, sees in new media nothing less than a media-technological and cultural apocalypse of the existing social order. Also, other stakeholders in this social order may join in, forcefully rejecting all that which new media both connote and denote. The Roman Catholic Church and universities reacted in precisely these ways to the new medium of the printing press – namely, through censorship and the inquisition. On the other hand, Protestants served as the social carriers and beneficiaries of this new medium. This led not only to the rise of protestant bourgeois morality (which can be said to have become a generic part of the global West), but also introduced a new logic for control and decision-making: This is a logic that proved extremely efficient in economic terms, and that allowed for the finest distinctions to hold sway in personal and religious matters. In a sense it undergirded and legitimized the personal and private spheres as sites of an individual's own construction of meaning. It is also one that still not unknown to cultural researchers (see: Leschke and Friesen, forthcoming): This is *hermeneutics* as the science and art of interpretation.

The School, the Media-System and Social Distinctions

After academics and educators secured writing as their *Leitmedium*, they had to defend both writing as an enculturated medium as well as the culture and values which it had been so invisibly but powerfully integrated. At the same time, these educators had to maintain the privileged status of interactive oral discourse as a kind of mediatic *ideal*. Both pure orality and a rarefied textuality had, each in their own way, to be regarded as positive, despite the many differences that separated them. This includes not only the fact that both belong to different epochs in the history of media, but also that the latter (textuality) has long taken the place of the former (orality) as the cultural *Leitmedium* in the west. The tension arising from the different types of privilege ascribed to written and oral media is an important one that has been little examined (see Giesecke 1991, 29–36 and Friesen 2013 for two exceptions).

In the context of this broad historical timescale, the end of the 19th century represents an important *caesura*. It is a moment marked by the appearance, over essentially three decades, of the gramophone, film, typewriter and other electro-mechanical media forms (e.g., the telegraph). The first three of these forms both the focus and title of one of the best-known German texts in media theory, by Friedrich Kittler (1986/1999). In this text Kittler explores how these technologies

have set into motion a series of challenges to the supremacy of text that are still working themselves out to this day. All the same, it is not surprising that pedagogy has chosen in this context to protect its one and only naturalized *Leitmedium* against encroachment by all others. In this context, an apocalyptic attitude to new media does indeed become indispensable kind of carry-on baggage, a sort of natural attitude.

The pedagogical reaction to new media also involves strategies of marginalization and interdiction. If it finally becomes impossible to minimize or ignore the rise of a given new medium, then this medium is integrated in a particular way: Its everyday use is made the subject of analytic and empirical study and normative prescription. The advocates and defenders of textuality have taken the media represented by film, radio and television and subjected them to this treatment. At the same time, however, the book remains *the* medium of reference for this process, the one medium according to which all others are measured. This history of emotionally-charged attacks against new media, the history of censorship and the *auto da fé* appears fairly consistently over the decades – but these have been only temporary. After a period of time, a given «new» medium makes its appearance as a controlled part of school life and an accepted unit of the academic curriculum. However, all the while, the book always retains its place as the medium of choice and reference; should this status itself change, then the academy would also have to abandon a wide variety of characteristics on which its legitimacy and recognizability currently relies; and it is clearly not yet prepared to do so.

In this sense, the school reproduces a media-system that is not entirely different from that of society in general in terms of its integrative nature, but that is distinct in terms the particular media that it seeks to preserve and privilege. This privilege is sustained through an implicit set of norms through which cultural value is ascribed to various media. The fact that this set of norms has no grounding outside of itself and the book as *Leitmedium*, and that it reflects the interests of established social actors rather than those of the young and marginalized, makes public debate about new media volatile and emotional. But it is still through such debate that the cultural value of various media forms are negotiated, often resulting in a kind of hierarchy of different media types. Computer games and online social networks, for example, have most recently undergone such emotional, quasi-deliberative processes, and have been integrated into academic studies of culture (e.g. game studies, network analyses) and school «media literacy» programs.

In school and academic settings, the criteria of (inter-)action, reflection and identity originally derived from the medium of the book are applied to new media and to the actors or advocates associated with them. Of course, these processes of negotiation are ones which newer media forms and their advocates enter at a significant disadvantage, and they rarely if ever gain the upper hand. Despite

this fact, the established media-system of the school has recently and gradually undergone a change from a purely apocalyptic to a more ambivalent position in the context of «media literacy» debates and curricula. As already indicated, the earlier naive refusal of any approach other than one of unmitigated critique of TV, popular music and other new media forms has been abandoned and replaced with a somewhat more open orientation. However, education's conception of the human subject, its criteria for assessing the cultural value of media still follow the *Leitmedium* of the book. Indeed the term «media *literacy*» communicates this fundamental ambivalence with both clarity and concision. The movement corresponding with this term represents an attempt to integrate these new and unnaturalized media into the media-system of the school, and from there to develop appropriate responses to them. This task has recently been simplified by the fact that computers, the Internet and social networks (as media theorist Hartmut Winkler [1997] suggests), are all text-based. This gives them a certain structural affinity to the privileged medium of the book.

These publically negotiated mediatic hierarchies generate and guarantee the subtle distinctions of «taste» that Pierre Bourdieu (1984) describes as serving the larger function of reproducing social life and its inequalities. Bourdieu investigates the everyday examples of gestures, ways of sitting in one's living room, and choices of music and cinema made by various demographic groups. These, he says,

> owe their specific efficacy to the fact that they function below the level of consciousness and language, beyond the reach of introspective scrutiny or control by the will. Orienting practices practically, they embed what some would mistakenly call values in the most automatic gestures or the apparently most insignificant techniques of the body — ways of walking or blowing one's nose, ways of eating or talking — and engage the most fundamental principles of construction and evaluation of the social world. (466)

Of course, such automatic gestures and apparently insignificant «techniques» of the body have now mutated and expanded to include those required or encouraged by new media. Some have noted, for example, the «genuflected» posture required in using one's mobile phone in public (e.g., Talman, 2013). Others have highlighted the rapid «twitching» characteristic of video game play (e.g., Prensky, 2007) – but which is also evident in adult use of various mobile devices. Bourdieu goes on to explain how these everyday habitual «techniques» and the objects associated with them function as markers of taste and class, and how these matters of taste play a constitutive role in society

> Taste is a practical mastery of distributions which … functions as a sort of social orientation, a ‹sense of one's place›, guiding the occupants of a given place in social space towards the social positions adjusted to their properties, and towards the practices or goods which befit the occupants of that position. (466)

Through distinctions of taste and the bodily habits and gestures that media encourage, the stratifications and distinctions of the embodied and everyday social world are reshaped and restructured. The type of marking and structuring offered by digital media, as argued below, differ significantly from those of the old.

The Book as Media-Dispositif

Traditional media-systems are constituted by an established number of individual media. To use a Foucauldian term, we can say that each individual medium represents an autonomous *dispositif*. This refers to a kind of «apparatus», a system of relations that includes both discursive and non-discursive interactions, components and manifestations of knowledge. At their point of intersection they can be said to constitute what Foucault describes as a «thoroughly heterogeneous ensemble» (1977, 194) – which can take the form of a particular media technology or artifact. Giorgio Agamben explains that such an apparatus or *dispositif* has multiple capabilities, including

> [The] capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviors, opinions, or discourses of living beings. [This apparatus] therefore not only includes] prisons, madhouses... schools... and so forth (whose connection with power is in a certain sense evident), but also the pen, writing, literature, philosophy, agriculture, cigarettes, navigation, computers, cellular telephones and – why not – language itself, which is perhaps the most ancient of apparatuses. (2009, 14)

The relevance of the apparatus or *dispositif* to media forms can be fairly easily illustrated through the example of the *Leitmedium* of the book. The folded pages of a book or codex, by their very physical nature, signal a clearly demarcated beginning and end, and indicate the amount of text lying between them. Unlike an ancient scroll or a scrolling Web page, the book suggests its closed and determinate nature to the reader as soon as he or she lays eyes on it. The book generally takes the reader through these pages in linear fashion, chapter by chapter, page by page and line by line, offering a highly organized and conventionalized presentation. Due to the pervasive nature of *Medienvergessenheit* discussed above, the book and its parts are generally not examined in this way in either theory or philosophy.

Instead, particularly in British empiricism, it has been used to exemplify a discrete, indubitable sensory object – highlighting precisely its determinate self-sufficient character. And this is done without giving a moments' thought to the constructed and culturally contingent nature of the book as an orienting epistemic metaphor or *dispositif*. The components and associated technologies of the book reappear with remarkable frequency as hypothetical cases according to which other questions of perception and ultimately, truth, are to be resolved. Locke, for example, imagines a stranger to the West being introduced to this object and its parts; being «told that all learned books consisted of paper and letters, and that letters were things inhering in paper, and paper a thing that held forth letters: a notable way of having clear ideas of letters and paper (1877, 117).» Later, Bishop Berkeley casts doubt on such reasoning through references to the indubitability of both books and (im)printing: «Can extended things be contained in that which is unextended?» Berkeley then answers: «You cannot say objects are in your mind, as books in your study: or that things are imprinted on it, as the figure of a seal upon wax"(1843, 273). William James later provides a pragmatist response to such arguments by considering the following: «The book here lying on the table before me, and the book in the next room of which I think and which I mean to get, are both in the same sense given realities for me, realities which I acknowledge and of which I take account» (James, 1904, 480).

As Berkeley's remarks suggest, the exemplary object of the book can be unambiguously closed and shelved with other books like it – something which is often done alphabetically by the author's last name. Particularly in academic contexts, the author, his/her words and arguments, and the book effectively become one, forming a highly flexible synecdoche: *The Riverside Shakespeare is* Shakespeare, a set of volumes on the shelf will *be* Dickens, embodying these identities with an authority, and a sense of finality and closure that is also public – as the word *publi*sh suggests. This consummates the finality and authority of the «work» as an individual and closed object. Patrick Bazin describes what has been referred to as «the order of the book» in a way that extends this description and also resonates with the Foucauldian *dispositif* as described above:

> [It is] a fundamental constraint that structures modernity's mental space: one which prescribes that text within the book be linear, and, especially, that it have a beginning and end… the book shrugs off all confusion between language and world, reality and representation; it intrinsically aims for effects of truth (of which literary *fiction* in particular is at bottom only the inverted double). […] the book sets the stage for a trilogy – author, book, reader – based on the separation of roles and a stability: on the one hand, the author, on the other, the reader, each exchanging their singularities through the stable, reliable, and public «interface» of the book. (1996, 159)

The media-system extant at a given point in history is nothing more than the set of such interfaces or media-*dispositifs* that happen to be available at the time. Movements and changes in traditional media-systems can be said to have occurred through the addition or exchange of these single-media-*dispositifs*. The *dispositif* represented by the codex or by another medium (e.g. dramatic recitation of a text or a hand-written scroll) could compete with these, very gradually but incontrovertibly replacing others or itself being replaced. A single medium, and by extension, its corresponding *dispositif*, could be selected from the existing media-system, and in theory, be identified as a *Leitmedium* or medium of reference in a particular context. This can be seen to be the case with composer Richard Wagner or philosopher Henri Bergson: For the former, musical forms undergirded his use of a range of other media forms (textual, dramaturgical, etc.) to constitute the *Gesamtkunstwerk*. Bergson on the other hand used metaphors based on the then newly-invented medium of cinema to develop his vitalist philosophy of change, motion and growth.

Digitized Media & Performativity

The digitization of media – whether of text, music, photography, film, etc.— represents a profound revision of media-systems and the dynamics of their construction. Of course, this does not mean that the digitalization of media, as some had predicted, has led to a general compatibility and interoperability of all media, and thus to the complete dissolution of carefully protected *dispositifs* of individual media. Instead, the ensemble of these *dispositifs* appears to have *imploded*, forming what can be called a «transversally-integrated» media-system, in which individual media and their *dispositifs* have only a *virtual* existence. Such an existence maintains only the *effect* of the differences between them. No longer physical or material (e.g., music on a stereo system, film on a projector, video on a TV/VCR), the differences between media are instead essentially *aesthetic*. If one today engages with radio, TV, film, games or social media, such engagement generally occurs through the same interfaces of screen, keyboard and pointer (or their touch-screen equivalents), and the difference between these media is largely a question of cultural or aesthetic *conventions*, rather than of the technology or materiality of any associated product. Our media-system today is consequently no longer an ensemble of completely heterogeneous technologies, platforms and processes. It is instead a system of differences defined virtually, culturally and aesthetically for which there is no longer any controlling or overarching material limitation or necessity. It is in this sense that it is «transversally» – associatively rather than physically or hierarchically – integrated. Our media-system, then, is actually a system of conventions, each of which owes its existence to much earlier processes of enculturation of traditional, *non*-virtual media-systems.

Reference to *virtual* media does not occur with the ineluctable and irrefutable certainty as it does with technologically closed and materially-encumbered media-*dispositifs*. Individual, physical media, in this sense, have lost their power to persuade and convince, and also their ability to ground thought, truth, place and certainty (e.g., with a closed book on the shelf authoritatively *being* Shakespeare). Furthermore, it no longer makes sense to try to secure an old or new *Leitmedium* for education, and to then highlight and privilege its characteristics when those of another medium present a challenge. It is also just as risky to associate the identity of particular groups in society with these fragile and changeable virtual constructions that were at one time so stable and definitive. In this sense the relationship between social and medial differences and distinctions is changed at its very core. In traditional media-systems there was at least *some* reliable ordering and association, as there was, for example, between the book and the educated bourgeoisie, the personal library and the enlightened aristocrat, or reality TV and the working-class viewer. Instead, the reference for social distinctions can only be constituted through the media-system as a whole. The magazine or book being perused disappears behind the back of a e-reader device; and with the earlier disappearance of the transistor or portable radio, the music now playing on one's invisible portable player is similarly rendered inaudible (for this *not* to be the case is in many cultural contexts a breach of social etiquette). Social and cultural differences no longer parallel differences in the use of specific media, but instead are based on the style and efficiency of the use made of the media-system as a whole. In a post-conventional, transversally interconnected media-system, the content of any work or of any individual medium is not particularly important; what matters instead is the style of one's performance *across* the media-network.

Differences and distinctions have become consequently more subtle and evasive, but despite this, they are no less important. It is becoming well-neigh impossible to signal social-cultural differences reliably: One must be able to work with ever finer distinctions in knowledge domains that are unstructured, and to engage with varying degrees of «fuzziness» or ambiguity generated through masses of information. The ability to tolerate ambiguity and reduce complexity are qualifications that are indispensable for effective performance in digitized media-systems. With complexity-reduction, information-selection and tolerance of ambiguity as the bases of medial performance, the hermeneutic logic of meaning, depth, interiority, wholeness and (self)-identity falls by the wayside. What takes its place are operations of differentiation, identification, combination and recombination, of association and application. Interpretation and hermeneutically-generated knowledge require closed and isolated objects (books, codices, «works», or even silently reading persons) in order to function properly; and it is precisely these characteristics that are irretrievably lost in transversally-networked

media-systems. That the hermeneutic orientation still retains its legitimacy in school settings reflects the fact that these settings are based on antiquated media and systems, ones which can only exist in protected environments, as in a kind of cultural bubble. The idea that at the end of ones schooling, one should be able to solve problems largely *without* reference to media – an idea which grounds any regime of standardized and high-stakes testing – is a familiar illustration of this situation.

This is all part of a transition from an orientation based on *content* to one based on *form* – from collections, cannons and repertories to genres, types and structures. Unlike media content, forms offer a key way of reducing the complexity of cultural products. Replacing the singularity of the author are elements which are always multiple and redundant --particularly *seriality* and *structure*. Indeed the centrality of form can be said to have replaced the authority of the author or creator him- or herself. Knowledge of the author in his or her singularity is replaced by the ability to recognize and deal reliably with multiple media forms – which range from sites of media consumption (e.g. library vs. cinema) to genre, style and other expressive conventions. Since the introduction of mass production in manufacturing, media-systems have worked with repetition and serial variation as a key ingredient. There are only a few sub-domains of high culture and schooling that have managed to suppress these characteristics, and thus are able to maintain media-systems in which singularity and self-sufficiency remains central.

The implicit knowledge of forms central to digital media is currently ignored by education. It remains unformalized and unsystematized, and consequently can currently be acquired only as «wild» knowledge collected on the street, as it were. Knowledge of the combinatory logic of serial drama, of game engines, and of the media and genre conventions interconnecting transversal media is currently mostly unreflected, unconscious and tacit. Systems of education which ignore these forms can be said to prepare students only for marginalized and historical modes of aesthetic and cultural production. These same students are consequently subjects with a sense of interiority and relatively static self-identity; by implication, however, they are also *not* performative subjects able to construct and regulate identity in diverse media environments and for different media audiences and purposes.

As the order of the book gradually dissolves, and the question of performance and performativity becomes increasingly important, the topography of education and individual (self-)development is also transformed. Socrates' dictum to «know oneself» is no longer an exercise in writing oneself and one's knowledge onto the pages of a (exercise) book – and in memorizing it for a test. As the media that mediate culture continue to change, and these changes reshape social reproduction, the skills and abilities requisite to their use, navigation and evaluation also change. As a multiplicity of Google search results leaves the authority of the singular author or

source ever further behind, it is the *performance* of the search and the subsequent reduction of complexity that becomes indispensable. Reproducing the skills and abilities requisite to such a performance in the complex, combinatory digitalized environment becomes a key educational task.

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