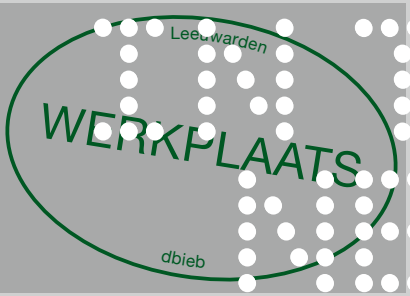
ATLAS MAKERSPACES IN PUBLIC LIBRARIES IN THE NETHERLANDS



Atlas: Makerspaces in Public Libraries in The Netherlands dr. Olindo Caso ir. Joran Kuijper

ATLAS

MAKERSPACES IN PUBLIC LIBRARIES IN THE NETHERLANDS

dr.Olindo Caso

ir. Joran Kuijper

Colophon

This publication makes part of the research project *Performative Spaces in Dutch Public Libraries. Stepping Stones of Inclusive Innovation* made possible by a grant of the NWO KIEM program Creative Industries CLICKNL. The National Library of The Netherlands actively collaborated with the TU Delft in this investigation.

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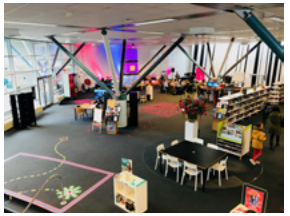
published by	TU Delft Open, Faculty of Architecture and the Built Environment, Delft University of Technology
ISBN	978-94-6366-147-8
graphic design	Michael Tjia (tjjjia)

“Makerspaces of all kinds are an important part of the development of public libraries in the 21st century. Thus, the creation of makerspaces in libraries is about lifelong learning, the democratization of new technology, user participation and making the library even more relevant to the community. Until now though, we have missed a thorough description of the interaction between makerspaces, libraries, architecture and urban development. The Atlas of Makerspaces in Public Libraries in the Netherlands prevails this shortage. By mapping Dutch makerspaces, analyzing their context and not least by discussing the role of the makerspaces and by pointing out key challenges this book is a welcome contribution to our knowledge of current library development.”

Dr. Henrik Jochumsen
Department of Information Studies, University of Copenhagen, Denmark.

Tilburg

Veenendaal



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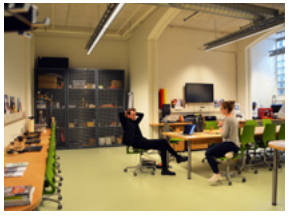
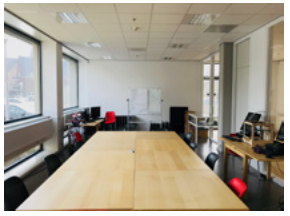


Apeldoorn

Utrecht

Leeuwarden



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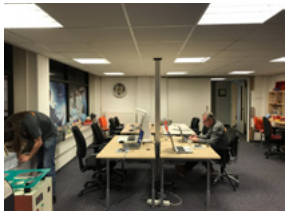

Steenwijk

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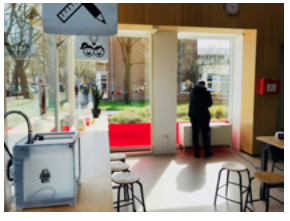


OBA Slotermeer

OBA Waterlandplein

Tiel

Preface

drs. Marianne Hermans
The National Library of The Netherlands

Public libraries want to contribute to an inclusive and innovative society and aim to enable their patrons to acquire the necessary 21st century skills. Dutch public libraries are therefore gradually adding more and more activities to their curriculum, teaching these different types of skills, such as 'invention literacy'.

They also often provide a 'performative space' (i.e. a makerspace) for their patrons. This means library spaces are no longer dominated by books, but rather reflect the current development in libraries' core business, moving from collections to connections in order to serve their local communities.

The KB, the National Library of The Netherlands, participated in the KIEM[1] project *Performative Spaces in Dutch Public Libraries. Stepping Stones of Inclusive Innovation*, researching the development of performative spaces in libraries.

This project, a collaboration with the Faculty of Architecture and the Built Environment at the Delft University of Technology, fits the KBs strategic interests in providing an innovative and socially aware library system.

1 The program Creative Industry – Knowledge Innovation Mapping (KIEM) is a funding program for research in the field of Social and Humanities Sciences of the Netherlands Organization for Scientific Research (NWO).

Important research questions included how public libraries create these so-called performative spaces for inventing and creating, what modifications are needed in terms of interior design and safety, and in terms of programmatic and spatial organization? As well as how do makerspaces connect to particular maker communities? The project results provided insight into spatial and design aspects of performative spaces, which helps public libraries, and ultimately its patrons, to benefit from this new development.

This book, the Atlas, presents the results of the research projects with illustrations of the different types of makerspaces as well as providing state-of-the-art information about performative spaces, focusing on the spatial characteristics.

It has been an honour and a pleasure to work with experts from Delft University of Technology and we hope and expect the KIEM project has sown the seeds for a sustainable collaboration on the subject of performative spaces in present and future library research. We see the Atlas as a joint starting point for a shared agenda on the performative library space of the future for librarians, designers, patrons and other stakeholders.

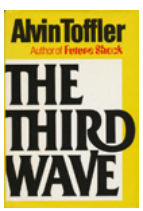
KB
Koninklijke Bibliotheek

The New Public Library as Supportive Environment for the Contemporary *Homo Faber*

dr. Olindo Caso

Ever since culture emerged as an autonomous field of human activities we have learned to deal with cultural products by distinguishing between those who produce them (art, knowledge) and those who consume them. However, this clear distinction has got increasingly challenged. Consumers and producers of cultural goods are more and more assuming both roles at the same time: they are prosumers (Toffler 1980; Sacco 2011; Ritzer et al. 2012). This heterogeneous group (potentially) knows a large participation, in turn impacting upon the way in which culture is made accessible by cultural institutes and upon culture's diffusion and position in society. The public library, once proverbially devoted to the consuming by patrons of the information stored in its collections, is changing accordingly: a new generation of public libraries is gradually appearing in which sociality, co-creation and collaborative learning become important keywords. These new libraries aim to offer users the opportunities for creating, making and sharing, and support the community with pro-active initiatives. Following American experiences these *creation libraries* (Levien 2011) are increasingly common in Europe too, where the Netherlands is a forerunner. The evolution calls for the refreshing of libraries' ambitions, programs, targets, scopes; along with the availability of adequate investments and specific library's planning. The building hosting the library also needs to evolve accordingly, in order to be able to materialize the

An early, unpublished version of this paper was presented at the conference *Cultural and Creative Industries. Economic Development and Urban Regeneration*, December 2015, Rome. This new version has been further updated, extended and deepened for publication.



The rise of the prosumers was first described by Alvin Toffler as a characteristic of the 'Third Wave'.

updated values and in order to make possible the renewed scopes. When it comes to this point, however, the existing codified knowledge on the design of public library buildings reveals itself insufficient – in turn illustrating an urgent need of a new, broader understanding of the spatial conditions associated to the renewed design assignments.

A new cultural phase is beginning

During the last decade the impetuous development of ICT has produced a myriad of applications that empower individuals with the ability to communicate, network, invent, create, make, manage, enterprise, capitalize. Possibilities once solely available for (large) institutes are increasingly coming within the reach of individuals – boosting their potential to access creativity at any step. Individuals and groups enjoy nowadays unprecedented possibilities to become active social and economic players, and they increasingly do. Pier Luigi Sacco, professor of Cultural Economics at IULM in Milan, observed the raise of a new phase in the relationships between culture and the generation of (added) social and economic value in which a traditionally passive audience transforms itself into pro-active cultural practitioners.

Unprecedented possibilities are currently enabled by the booming ICT applications. *Image https://www.riemysore.ac.in/ict/unit__1__information_and_communication_technology.html*

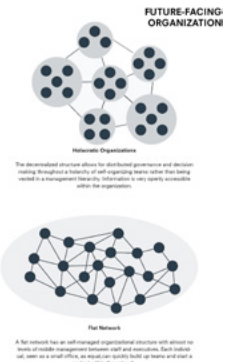
> "*The hallmark of Culture 3.0 phase is thus the transformation of audiences (that are still the reference of the 'classical' phase of cultural industry) into practitioners […] – accessing cultural experiences increasingly challenges individuals to develop their own capabilities to assimilate and manipulate in personal ways the cultural content they are being exposed to. The passive reception patterns of the 'classical' cultural industries*

phase are now being substituted by active, engaging reception patterns. The other hallmark of this phase is the pervasiveness of culture, which ceases to be a specific form of entertainment to become an essential ingredient of the texture of everyday life …" (Sacco 2011, p.4).

Cultural paradigms in time, according to Sacco. *Image, Sacco: Developing impact goals for Cultural Heritage 3.0. Slide Share.*

According to Sacco, while the Culture 1.0 phase was characterized by the concept of patronage and while the Culture 2.0 phase has seen the expansion of the audience (the users) due to the increased capabilities to reproduce artistic products, the Culture 3.0 phase we are entering in is characterized by the "*explosion of the pool of producers*" (Sacco 2011, p.3) and by the closely interwoven relationships of culture with everyday life – resulting in the fragmented dynamics of the 'post-Fordist' production processes as observed by Lash & Urry (1994). The enhancement of the Do-It-Yourself (DIY) capabilities of individuals impacts the cultural markets in multiple ways, potentially opening far-reaching possibilities for the creative industries and the economy. Not only thus, in terms of direct cultural production alone – but also (and most significantly) in terms of creative spill-over to other sectors (Sacco 2011, p.5): the better informed prosumer also demands better products, as well improved in quality and process.

As ICT applications are the main facilitators for contemporary DIY'ers[1], we can recognize three conditions that influence the active cultural participation of individuals, eventually affecting its impact on economy and society: 1) access to technology; 2) adequate literacy; 3) a receptive context.



Post-fordist production shows a growing fragmentation in participating actors. *Image, Complex Projects Graduation Studio, TU Delft.*

1 DIY obviously includes a wide range of (low-tech) (artistic) production as music, painting, home-brewing, and similar. Nevertheless, the present booming can be related to the enhancements made available by ICT developments.

Re.1: Although tools of rather professional quality have never been so diffused and affordable than nowadays, yet laser cutters, 3D printing and sketching, smart chips, robotic components and similar are still beyond the reach of the average individual. Burdens also includes expenses for maintenance and for the materials, and the appropriate spatial requirements (size, environment) hardly to be realized in domestic sphere, especially in dense urban settings. In the practice people joins into groups, likely after (conspicuous) membership fees, in fact constraining a wider cultural participation (Holman 2015).

Re.2: The DIY'ers engaging in advanced technology must be acquainted with its forms, logic, language and methodologies, if not its practice. Digital literacy and the managing of '21st century skills' are prerequisites for the active participation of individuals in the knowledge society, not a choice. Digital natives (Palfrey & Gasser 2008) will be better-off than the present generation, yet it is plausible to think that not everybody will be the same way comfortable with new technologies. Furthermore, education, assistance and (peer) support/tutoring are crucial also when we consider more traditional forms of culture and creativity.

Re.3: A receptive context involves political choices and socio-economic recognition of the phenomenon along with platforms to exchange and possibly exploit the process. Active cultural participation will hardly develop in contexts that are not prepared to welcome it, that do not facilitate it and/or are not supportive enough. "*Capability building and skill acquisition* […] *crucially depends upon the social environment in which individuals are embedded*" (Sacco 2011, p.5). Online platforms somehow mitigate the influence of the physical context, yet the local community and its 'serendipity' is an essential drive.

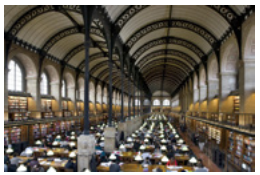
Advanced tools are still costly for the average maker.

21st century skills are more than the command of digital technology. *Image, http://cmpf.eui.eu/media-literacy-going-digital/.*

A makingfaire as makers market. *Image, https://viral-hare.com/makingthefuture.*

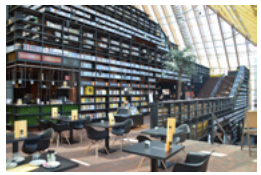
These conditions show that the access to the claimed opportunities is not self-evident, but depends on constraints of various nature. If we expect[2] that these raising developments will increasingly assume a leading role in future economy and society then specific policies are needed to exploit the new cultural phase in the future, by helping its wider diffusion and anchoring it into the local communities. Otherwise there is a risk of creating new types of socio-economic underdevelopment and for the disadvantaged of lagging further behind. The central assumption of this contribution is that a renewed public library is a crucial social infrastructure for unchaining the potentialities of 'Culture 3.0' and a relevant strategic tool to support policies of inclusive growth based on a future of diffused literacy and entrepreneurship. Accordingly, the spatial dimension of the public library as social and cultural infrastructure needs to be explored in greater detail.

The changing public library



A traditional image of the library. Bibliothèque Sainte-Geneviève by Labrouste, Paris. *Image, ArchDaily.*

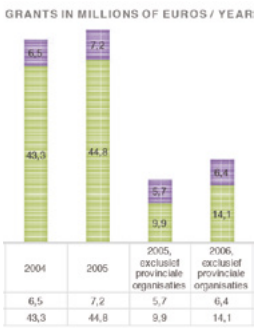
Until recently, libraries where conceived as introvert spaces designed in order to house collections (specifically books) and to render these collections accessible to patrons. This idea of the public library as a silent building inhabited by endless rows of books is not the rule anymore. Changes in technology, life-styles and ways of learning and communicate have brought about profound changes in the way we understand their role and function, although the collections are still taken as major identifier by the most designers and managers. At the same time, a changing welfare (at least in western countries) is leading to



De Boekenberg library at Spijkenisse (MVRDV) adopts the book as an exposed symbol of collective imagery. *Caso.*

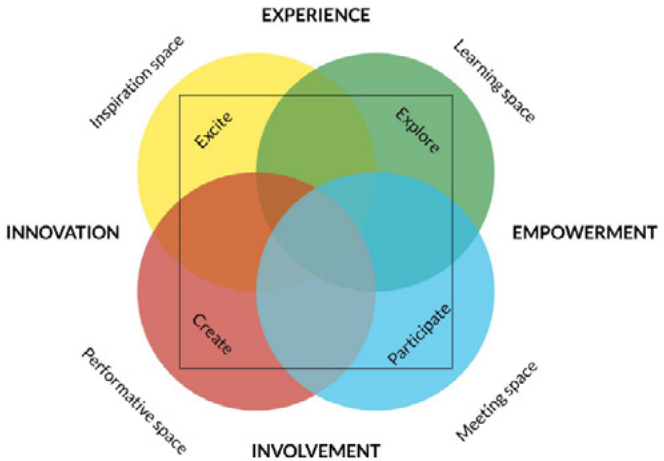
2 Present developments (e.g. Uber-economy, GIG-economy, Grass-Roots initiatives) depict a splintered, fluid future economy landscape in which small-scale, individual initiatives become more the norm. EU policies push long-life learning as motor of future (inclusive) growth (see a.o. EU flagship initiatives *Agenda for New Skills and Jobs* and *European Platform Against Poverty*). The EC foresight study *The Knowledge Future* (EC 2015) suggested policy measures to boost future competitiveness in which (individual) knowledge, skills, creativity, entrepreneurship are key factors.

The library program is increasingly layered: sociality, co-creation, collaborative learning, inspiration... *Image, Ederbro Sikström: Collaboration and Co-creation. Slide Share.*



Declining welfare: in the Netherlands the library budget was drastically reduced in 2005. *Image, adapted from Siob.nl.*

new modalities of governmental support, resulting in the decline of budgets allocated for culture and public libraries - at once requiring new strategies to libraries for staying meaningful for contemporary and future generations. Several studies have attempted to redefine the obsoleted boundaries of the library and to sketch possible future evolutions (e.g. Levien 2011; Davey 2013; SIOB 2014). These studies reveal the changing condition of the contemporary library that is expected to become an active centre of knowledge, participation and empowerment in service of the community.



The Four-Space model. *Jochumsen (et al. 2012).*

Studying the Danish context, Jochumsen (et al. 2012) defined a cloud of properties[3] that inform the contemporary library and elaborated them into a model articulated in four mutually interrelated spaces: inspiration space (excite); learning space (explore); meeting

3 Experience, Innovation, Involvement, Empowerment; with shared sub-clouds of possible associations.

space (participate); performative space (create).[4] This model provides a tool to understand and plan public libraries which is by now commonly adopted in Denmark. The '*performative space*' is particularly interesting in the context of this contribution as it shows close connections with the raising Culture 3.0 phase. Indeed, in a more recent study Jochumsen (et al. 2015) confronted Sacco's argumentations with the public library's timeline, pointing out evident correspondences between the cultural phases and the public library evolution, both in terms of relationships of patronage (the financer is the philanthropist, the king, the state) proper of the Culture 1.0 phase, and in terms of marketing/branding/managing strategies adopted by public libraries in contexts of the mass-economy (the user as a customer, the library as an urban icon) proper of Culture 2.0 phase. For Jochumsen (et al. 2015) then, the parallelism between Culture 3.0 and the evolutions in public library practices is to be found in the performative turn (Fischer-Lichte 2008) that many public libraries are experiencing. The study reports practices from Denmark (Copenhagen: Demotek, FabLab), Finland (Library 10, Helsinki), and Sweden (The Garage, Malmö) that place (digital) DIY possibilities at the centre of the library experience. In the performative spaces users are inspired to give free rein to their own (artistic) expressions and are given the tools to invent and 'make' their products. This refers to both 'creation' and 'innovation',

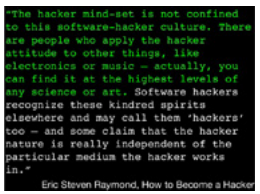
Helsinki Library 10 is specialized in music, including the related performances. *Image, found on Pinterest.*

4 The 'inspiration space' is the space of meaningful experiences that inspire the visitor to move beyond the ones (s)he is familiar with, including the emotional and the irrational – i.e. story-telling, artistic expressions. The 'learning space' is the space where visitors can acquire/update (new) skills and knowledge. The traditional mode of knowledge transfer (the book) is nowadays integrated by a number of other digital and physical possibilities. The 'meeting space' is the space of social participation, like a public space ought to be: a democratic space where people can encounter other citizens, engage in debates and other social activities, and develop a sense of public belonging. The 'performative space' invites people to develop own artistic expressions and/or craftsmanship, being basically (but not exclusively) a place of making/doing (digital or manual) (Jochusen et al. 2012).

according to the main focus of the act of performing (Jochumsen et al. 2015).[5] The public library becomes in this way a fertile territory for the makers.

The upcoming makers movement

The hacker mind-set. *Image, Haas: The Art of Culture. Hacking. Slide Share.*



The development of the new performative attitude by public libraries parallels the diffusion of the makers movement in all its different forms. Anderson (2012) and Hatch (2013) provided this heterogeneous, originally American movement with a framework and a manifesto, claiming the revolutionary contribution of the makers culture.[6]

Essentially, the makers are literally interested in 'making' physical and/or virtual 'things', but there is more to it than this. Makers share a passion for understanding the rules behind objects and processes, an anarchist desire to challenge the established order and explore improvements that are supposed to open the path to equity. Makers often manipulate, combine, reproduce existing products; they remix cultural contents they are exposed to in order to create new (hybrid) contents/products (Lessig 2008). They reject traditional copyright and adopt collaborative logics enabling "*new, non market-mediated forms of cultural and creative exchanges*" (Sacco 2011, p.4).

The cover of Anderson's book from 2012.

5 This distinction is not exclusive. In the practice the two areas often overlap and are connected with each other.

6 The 'makers revolution', also considered a 'new industrial revolution' (e.g. Kerr 2015), is expected to bring about a re-invention of the manufacturing industry and a true democratization of the capitalist economy by potentially placing individual creativity at the centre of the process. Whether these expectations will come true is beyond the scope of this paper and will not be discussed. However, among the general euphoria there are critical voices too (i.e.: Morozov 2014).

The makers meet in places that are equipped at this end: hackerspaces, makerspaces, FabLabs, Tech-Shops and so on.[7] The makers' success can (at least initially) seldom be measured in concrete economic terms, but in worth literacy and the evidence of their (creative) talents (Lessig 2008). Indeed, makerspaces hardly are economically successful as they mostly do not overcome a hobbystic dimension. Holman (2015) suggests that makers should now take a new evolutionary step by focusing on services and on local communities, not only on own products. Interestingly, governments too seem to increasingly discover the possibilities offered by the makers approach. For them the gain in literacy and entrepreneurship skills could provide powerful engines for further economic (re) development. During its mandate, president Obama stated that makers are a chance for the manufacturing industry and for the American economy and advocated for innovation in manufacturing industry. He challenged "*every company, every college, every community, every citizen [to] join us as we lift up makers and builders and doers across the country*".[8] Regardless of how the actual president or the future ones look at it, the maker movement in US is continuing to grow and to set new goals (ASEE 2016).[9]

Maker Faires are increasingly common, not only in the US.

7 We use here the generic term 'makerspace' for all types, unless specified. In general, hackerspaces and makerspaces are not bound to (technical) conditions. Everybody can initiate one. On the contrary the 'fabrication laboratory' (FabLab) must adhere the Fab Charter, following an idea of MIT professor Neil Gershenfeld (http://www.fabfoundation.org). Their specific emphasis lays on the development of high-tech 21st century skills and of users' entrepreneurship. FabLabs and Tech Shops (craft-oriented) are franchise concepts. Other terminologies can be found as well, like DigiLab or FabCafé – in fact being this an open field for colonization. See: Cavalcanti (2013).

8 https://www.whitehouse.gov/nation-of-makers

9 "*There were more than 135 million adult makers, more than half of the total adult population in America, in 2015*". Quote from Open Education Database (OEDb) makerspaces resources website: https://oedb.org/ilibrarian/a-librarians-guide-to-makerspaces/

Worth a mention too are China's big plans regarding manufacturing (Made in China 2025) that include support for the increasingly popular makerspaces and start-ups (Danning 2015) to stimulate innovation and entrepreneurship.

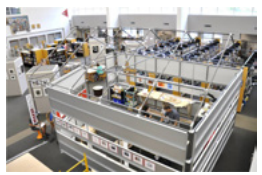
Lab-raries

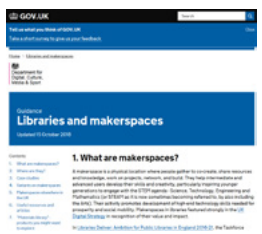
The 'Fabulous Laboratory' at Fayetteville Free Library opened in 2012. *Image, http://publiclibrariesonline.org/2012/10/a-fabulous-labaratory-the-maker-space-at-fayetteville-free-library/.*

Not surprisingly then, makerspaces of all kinds are arising worldwide, and they catch the attention of governments and sponsors. In this context the combination with (public) libraries is becoming more frequent. A report of the American Library Association (Levien 2011) prefigured the '*creation library*' as strategic development option: a multimedia extended library where users could find (advanced) tools and inspiration to prepare new work. The practice followed soon. The first libraries to embrace makerspaces (in 2012) were American: the Fayetteville Free Library (New York State) and the Westport Public Library (Connecticut). Chicago came soon after (Willingham & De Boer 2015). Today, searching the net for 'makerspaces in libraries' you come across hundreds of hits in both public and academic (American) libraries. In BENELUX a list of fablabs can be found at http://fablab.nl, where many are by now located into libraries or hold some degree of collaboration with a library. The UK public library landscape also discovered the raising phenomenon, and established a national task-force for guiding the development and mapping the presence of makerspaces in libraries across UK.[10]

In fact, librarians and makers likely have similar ethics. Supportiveness, sharing, democracy, inclusiveness, informal learning, bottom-up initiative, community support, openness are keywords that supply much common ground between public libraries and

A makerspace at a public library in US. *Image, https://www.core77.com/posts/25086/Chicago-Public-Library-to-Open-Free-Digital-Fabrication-Maker-Space.*





UK governmental website dedicated to library makerspaces. See footnote 10.

10 Visit: https://www.gov.uk/government/publications/libraries-and-makerspaces/libraries-and-makerspaces

makerspaces. However, this is not enough to explain the reciprocal attraction. It is as much a 'marriage of convenience' too. On the one hand the public library is searching a new contemporary dimension to remain meaningful for the community and the users,[11] for this willing to explore actual trends and developments which are compatible with own statutory mission and ethics. In this view hosting a makerspace is part of a strategy of repositioning of the public library in the social context and in the collective imagery. On their hand, makers can find in the library a stimulating environment to grow and realize own goals. This applies to both the availability of favourable conditions[12] and the reach of the wider (library) communities. Finally, this collaboration can potentially produce added value for both and lead to valuable ways to fertilize new ideas while facilitating access to sponsorships.[13]

Makers are finding their way in the Netherlands too, where the number of makerspaces is exponentially growing.[14] In this, the combination with a public library is increasingly popular (e.g. Apeldoorn, Hilversum, Flevoland, Zeeland, Leeuwarden, Veenendaal and others) as shown by recent survey results (KB 2018).

Percentage of libraries with one or more physical makerspaces. *KB (2018).*

FabLabs in the Netherlands. *Image, http://fablab.nl/fablabs-in-de-benelux/*

11 The public library is still the elected place for an inclusive, democratic access to information and knowledge. Nowadays this definition includes literacy in new technologies and connected learning.

12 The three major budget voices for implementing a makerspace are location, equipment and staff (Boeck & Troxler 2011). Libraries are convenient locations because they already own the needed space; the staff can learn new competencies; the equipment is likely to be more easily subsidized to a library as part of a community engagement project.

13 However, sponsorship and entrepreneurship remain difficult issues in library environment, basically due to the 'non-profit' and independent status of the public library.

14 See the list from http://fablab.nl as an indication. Non-fablab makerspaces are to be added.

Dutch context

The new Bill on the public library system[15] (WSOB 2014) updated the framework in which Dutch public libraries operate, redefining their role and enabling a broader servicing within a context of local autonomy. Among others, the Bill reaffirmed the responsibility of the local government to ensure public access to information and culture, while leaving to the local democratic concertation the modalities and amount of public support to libraries. Meanwhile almost all public libraries in the Netherlands have changed their legal status and became autonomous foundations bearing more (financial) responsibility. In this new framework, a more pro-active and community-oriented approach from libraries is necessary to mobilize consensus and thus resources (Caso 2016).

The emerging library concepts in the Netherlands generally elaborate around social encounter, discovery and the public sphere, where digitalization and new media increasingly take a central place. In doing this the public library aims ever more to promote itself as an elective 'third place' (Oldenburg 1989; Vos 2017). Also, they often merge with other local (cultural) players establishing alliances, mostly in the framework of local (urban, municipal) strategies. In this context the makers offer additional opportunities for the public library due to the growing belief in the potentialities of the makerspaces for the knowledge economy, in which the public library can act as low-threshold inclusive incubator of digital literacy, ideas, entrepreneurship. The project 'Fab-the-Library' (to support setting up makerspaces in libraries) received in 2014 a grant from the SIOB[16] as most

Library as Third Place. *Image, Habib: Digital Library as Third Place; http://www.mchabib.com/2006/10/05/digital-library-as-third-place/.*

Library system in the Netherlands after the WSOB. *Lankhorst 2015.*

15 Enforced 1 January 2015, it recognizes, regularizes and orders a practice which was already in development.

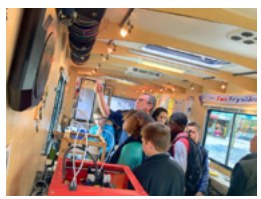
16 The Netherlands Institute for Public Libraries, now merged into the National Library of The Netherlands.

promising initiative for the Public Library Innovation Agenda, and served as a stimulus and a model for the further development of makerspaces in libraries. The link between library and makerspaces could provide indeed added value as a potentially advantageous business-case. What the makerspace could do, is to help evolve the library into a Culture 3.0 laboratory of knowledge, where users are not only approached as the consumers but also as the producers of knowledge and culture. In this sense it contributes to move the library's image from 'loans' to the development of people and community.[17]

Dutch experiences

The FryskLab has been the first European FabLab initiated by a library (by Provincial Library Friesland in 2012) (De Boer 2014). It is maybe the most well-known makerspace in the Netherlands and has been (still is) a model for other Dutch initiatives of this kind. It is a mobile FabLab housed in a former biblio-bus that used to carry a mobile library to reach patrons in villages and country-side. The bus can be positioned on demand next-door a requiring institute like a library or a school, and is regularly touring. The FryskLab has a strong inspiring impact on users and institutions and is at the base of many innovative projects that are able to attract funding. "*FryskLab creates a healthy interest in technology and maker skills, hereby stimulating digital literacy. Users of the lab will be able to use tools and skills to design and remix their personal environment and share these with others*".[18]

Frysklab bus. *Image, http://www.frysklab.nl*



Interior of Frysklab bus in operation. *Image, http://www.frysklab.nl*

17 At this regard it must be noted that the positions regarding the phenomenon are not univocal. The question asked is the same as Mattern's (2014): in how far can we stretch the public library? Much depends on the relationships with the community and the specific local demands, in which a good balance should be realized.

18 http://www.frysklab.nl

The FryskLab especially focuses on educative projects and on improving the skills that are required to participate in the knowledge society, and operates in a region where poverty rates are double than in the rest of the Netherlands and where early school leaving rates high (Willingham & De Boer 2015). Another Dutch mobile FabLab supporting (public) libraries is the MakersBuzz, based in Tilburg (Willingham & De Boer 2015).

The MakersBuzz in action. *Image, https://mooinisse-roi.nl/nieuws/6936/12922/makersbuzz-tue-junior-maak-kennis-met-techniek-in-bibliotheek-heesch*

The Frysklab collaborated with other libraries like the Apeldoorn's CODA and the Zeeland Provincial Library (Zeeuwse Bibliotheek) at Middelburg in order to set up maker-spaces in these libraries too. The CODA is an umbrella for a diversity of (cultural) functions including the local museum, the public library and the historical archives. The makerspace is part of the public library and has a recreational and educational purpose for all users. The Zeeuwse Bibliotheek at Middelburg has similar finalities. More libraries followed the example, among which Veenendaal, Breda, Leeuwarden, Utrecht, Zwolle, Westland and others, sometimes absorbing external already existing experiences into the library. OBA Amsterdam recently started an own development project to bring 'making' to the local communities through the implementation of the project 'Maakplaats 021' into its branch-es.[19] OBA will invest a conspicuous budget in this project in the coming years. At the present day local makerspaces have been implemented in three OBA's branches.

CODA at Apeldoorn. *Caso.*

The Zeeland Provincial Library at Middelburg hosts a FabLab. *Caso.*

More research is needed to understand potential and impact of the makerspaces in Dutch libraries, yet some general characters can be already mentioned here. Several mak-erspaces in Dutch libraries are FabLabs, thus linked to the worldwide network and bound to the FabLab charter.[20] Although generic makerspaces and FabLabs should not be seen

Maakplaats 021 is an initi-ative of OBA Amsterdam.

19 Visit: https://maakplaats021.nl/

20 Visit: http://fab.cba.mit.edu/about/charter

as competitors, presumably public libraries feel the association with the FabLab network more keen to own ideals as it explicitly supports educational finalities along with the sharing of knowledge. On the other hand, the library may enjoy the support of the network when faced with (technical) questions and issues, being itself a learning institution.

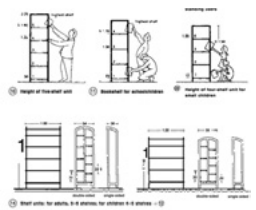
Dutch experiences with makerspaces in libraries also report staff-capacity issues and issues with the specific knowledge needed (training). Another point of discussion is the extent at which the library makerspace could support local entrepreneurs in their activities, due to staff and equipment capacities and to the ethical constraints related to the traditional non-profit DNA of the public library institution.

FabLab extensive network could form an attractive option for initiating a library makerspace. *Image, https://blog.adafruit.com/2012/10/11/how-to-make-almost-anything/.*

Spatial issues

These developments evidently challenge the codified design knowledge and the understanding of the public library as physical building. In designing libraries, architects can rely on typological considerations (e.g. Pevsner 1976), on normative dimensions (e.g. Neufert et al. 2012) and on a treasury of thematic interpretations carved in the physical realizations: the 'jurisprudence' of architecture (e.g. Barbieri et al. 1997). The local context contributes its specific programmes and regulations to the practice. In general, this knowledge emphasises the traditional role of libraries as repository of collections, offering good practices and design solutions to organize the relationships between the preservation of collections (books) and their fruition in reading rooms.

The contemporary architectural practice of library buildings has broadened the gap between codified knowledge and the new design assignments, staging a series of realizations which respond to a vast array of new considerations and demands. In this, each



"Public libraries offer general literature and other information media which are directly accessible on open shelves". *Neufert (et al. 2012).*

Pages from the chapter 'Libraries' in Pevsner's *History of Building Types*. *Pevsner (1976).*

new assignment originates a specific design process in which the designer likely feels itself entrusted with the task of re-envisioning the library building of our times, over and over again. In urban development, the resurgence of the physical library (Hvenegaard Rasmussen & Jochumsen 2009) is related to the rediscovering of 'culture' as a city-marketing strategy (Miles & Paddison 2005; Vickery 2007; Abrahams 2016). Observing this trend in the case of the public library, Skot-Hansen (et al. 2013) made a distinction into three categories: library as cultural icon (e.g. Seattle); library as place-maker (e.g. OBA Amsterdam); library as community vitalization / catalyst (e.g. Idea Stores London) elaborating upon the main choices at the basis of the realization of the library and of the community served. Vallet (2013) made a similar distinction in dealing with the urban meaning of nine library buildings in Flanders and the Netherlands: the library as urban landmark (e.g. DOK Delft); the library as area-oriented herald (e.g. Antwerp); the library as target-group patron (e.g. Roosendaal). Also her study enlightened the basic choices made as to the strategic relevance of the library in urban (re)qualification goals. In all these studies the authors emphasize the specific value that the library confers to culture: to render it accessible to the community of reference; valuating the potential of the public library for (shared) goals of urban planning according to their community embedment. Indeed the degree at which the public library is successful coincides with the level of engagement it generates into the served community (Lankes 2012). Then, the role of the architectural design in conferring a specific identity to places and spaces coincides in the case of the library with the role of representing the community being it a city, a neighbourhood, a district or a rural area. The focus lays on the library as local asset, as gateway of knowledge and information and as public mediator / social catalyst favouring 'grassroots' forms of

Library as place-maker: OBA Amsterdam. *Caso.*

Library as cultural icon: Seattle Central Library. *Image, https://superheroesin-racecars.com/2016/06/22/seattle-public-library-has-free-access-to-lynda-com-and-safari-books-online/*

Library as community catalyst: Idea Store, London Whitechapel. *Caso.*

local socio-economic development. For this, Mattern (2014) proposed the metaphor of the 'social infrastructure' as an appropriate reference for understanding (contemporary) libraries and emphasize the territorial, three-dimensional layering of the networking structure of the public library.

The metaphor of infrastructure to synthesize the role of new libraries in urban setting seems to gather consensus. Also Holman (2015) adopts the metaphor of 'civic infrastructure', this time in order to define the makerspaces and their scopes within the contemporary urban territory. In this infrastructural conception it is plausible to envision libraries, making and culture increasingly merging with each other forming a new 'smart' artefact that we obstinately keep naming 'library'. Accordingly, the future emphasis must consider a networking system of cultural (library) buildings that empower users to engage in (co-creative) making, that establish connections with peers (people and institutions), that are 'open-source' and that stimulate the production of new knowledge, not its consuming alone. It should be a collective environment, a community-centred public place for (non-market mediated) social and material exchange. The emphasis on the 'book' as identifier should gradually make place for an emphasis on knowledge exchange and autodidactic self-realization / self-representation. Possible design metaphors for this new library building are those of the public marketplace, the collective workshop, the community kitchen, the creative hub, the start-up agency, the factory. The Waiting Room at Colchester, UK, was a library branch entirely devoted to this new understanding of the public library. Unfortunately this temporary experience has been now terminated. It was located in a former waiting room for bus lines connecting the town, essentially offering spaces to the community for workshops, development of new library services,

The Waiting Room at Colchester, UK. *Image, Britishletterpress.co.uk*

Rozet Cultural Centre at Arnhem NL. *Caso.*

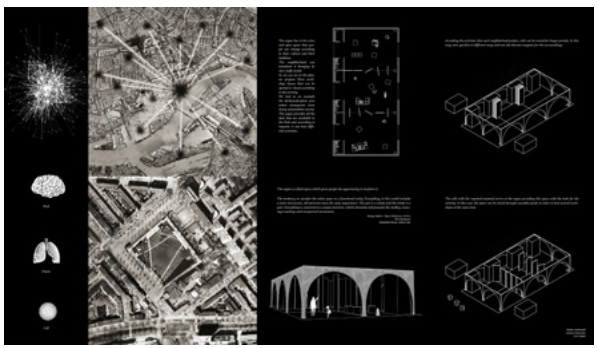
Chocoladefabriek at Gouda NL. The print workshop. *Caso.*

performances (Willingham & De Boer 2015). The management of the Waiting Room was actively participated by local stakeholders and by the Colchester School of Arts. Also inspiring, the Waiting Room experience rediscovered a place once commonly central in the spatial behaviour of locals: the bus station. The Garaget in Malmö has a similar finality and is bottom-up participated by the community of reference, which can change and reorganize the spaces according to changing necessities (Jochumsen et al. 2015). In the Netherlands, the recent emphasis on library as public space (i.e. Rozet Arnhem, Eemhuis Amersfoort) and community alliances is increasingly integrated by making metaphors (like in the Chocoladefabriek Gouda) and by dedicated spaces for different types of performances, of both creational or innovative nature. However, this has not yet brought to the redefinition of the design and spatial characters of a contemporary library with reference to a more ‘active’ users' behaviour. This would indeed imply to address challenges like: visibility of the machinery in operation; the centrality of the learning experience also through the process of imitation and remake / remix; the relationships between the physical frame and the flexibility in operation; the collaboration across the different ways of accessing and make culture; and so on. At this end, non-competitive relationships between the makerspace-related spatial constraints and the fruition of the overall library needs to be re-invented. These libraries will not need to be per se spectacular buildings, but to embody their special meaning for the neighbourhood and the community of our times.

The narrative of the library of the future as the epicentre of a community of cultural practitioners forms a new assignment in library architecture. It is not the only possible future, yet the theme of the pro-active contribution to the construction of people's own future and of a better world can be shared by different ideas of library.

Garaget at Malmö, SWE. *Caso.*

When re-invented and reprogrammed in the spirit of Culture 3.0 development (Sacco 2011) the library would need a new type of spatial organization which is able to refresh and materialize the contemporary values. In doing this ‘learning-by-doing’ and plurality will plausibly take an even more relevant position in profiling the library as a complex urban cultural centre.



Library as a network of 'organs' connected to a central brain. An organ is equipped with on-demand plug-in information cells of specialised content. *Image, TU Delft students Andrianelli, Fornasiero, Spada. 2015 Workshop The Future of Libraries?*

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The Atlas: Introduction

dr. Olindo Caso; ir. Joran Kuijper

The first ten years of this century Dutch public libraries moved their focus from *collections* to *connections*. Currently, libraries are stepping towards invention: by integrating traditional knowledge-consumption and opportunities for knowledge-production they potentially become inclusive laboratories of innovation and agencies for a participated *knowledge society*. Libraries offer workspaces, tools and tutoring enabling their users to make, discover, co-create, collaborate and share. These so-called Performative Spaces facilitate and support both *innovation* (technology oriented) and *creation* (arts and crafts oriented) bringing FabLabs, makerspaces[1] and other opportunities at the reach of all citizens; and allowing libraries to keep pace with societal developments.

Yet, little knowledge is available on the implications of this performative turn in Dutch libraries. How many performative spaces exist in Dutch libraries, and what do they offer? How do they are managed? Which tools, staff and expertise are present? What relationships exist between the library's performative initiative and the context of reference? What problems do they face? In particular, the spatial conditions related to the integration of makerspaces in the context of the Dutch public library are a neglect. What size, form and articulation do they have? Are the makerspaces designed or empirically constructed?

1 The terms 'makerspace' and 'performative space' will be used as synonymous to indicate in general all different types of places in which the (digital or physical) 'making' is the main scope – unless when specifically addressing a particular type (e.g.: FabLab). Also read footnote 7 at pag. 16, previous chapter.

The department of Architecture at the TUD Faculty of ABE, and the National Library of The Netherlands have been partners in this research project.

Do they hold any relationship with the city space? Are them a visible, well-integrated service in library? And what about aspects like noise, dust, privacy? Better spatial insights (design, programs, activities, equipment, experiences) could significantly improve public libraries' potentialities as meaningful actors of societal innovation. Space (and its design) is he fundamental link between programs and activities.

This work aims to gather information about the state-of-the-art in Dutch public libraries when the performative space is introduced, focusing on the spatial characteristics of this introduction. For doing this, the research group at the 'Faculty of Architecture and the Built Environment' (ABE) of the 'Delft University of Technology' (TUD) initiated a collaboration with the 'National Library of The Netherlands' (KB) by proposing the project *Performative Spaces in Dutch Public Libraries. Stepping stones of inclusive innovation* that received a grant from the national NWO KIEM program.[2] This project is part of the ABE research program 'Architecture and the City' and matches the priority interest of KB towards a socially embedded, innovative library system in the Netherlands.

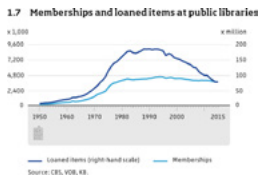
KIEM is a funding program offered by the NWO, see footnote 2.

Relevance

The reach of the Dutch public library system is considerable, counting upon 3.8 million subscribers (CBS 2017) and covering the entire Dutch territory through almost 1,000 branches enabling an average distance of 1.8 km to a library. The performative turn in public library therefore represents a crucial opportunity to (re-)establish sustainable connections between inclusiveness and innovation, in this responding to the challenge of

2 Visit: https://www.nwo.nl/en/funding/our-funding-instruments/gw/creative-industry/creative-industry---knowledge-innovation-mapping-kiem/creative-industry---knowledge-innovation-mapping-kiem.html

"In 2015, there were 156 public libraries with a membership base of around 3.8 million, including 61 percent young people. Libraries have adopted a wider range of services in recent years beyond the lending of books". *CBS (2017), p. 13.*



favouring an inclusive and innovative society in the Netherlands. In particular, the performative library has the potential to stimulate the active participation of citizens into an inclusive smart knowledge society and a (creative) knowledge economy. The spatial/design aspects of the performative library will be relevant for a successful development of these processes.

Because of the reach of the public library system, the performative library has the potential of being an efficient mean for broadening participatory, self-directed innovative behaviour across citizens and communities in the Netherlands, maximizing the impact of digital literacy programs and improving social resiliency. At this end the research gives evidence to the relevance for users of the spatial aspects of libraries' performative spaces. Notably, considering that about 61% of Dutch under-18s holds a subscription to the library (CBS 2017), the potentiality of the library's performative turn for the future generations is self-evident in turn asking for future-oriented (design) concepts that supports the development of incubators and creative labs for innovation in library context. This performative library could be designed as an experimental, playful laboratory where flexibility, interactivity, engagement and supportiveness are the key principles.

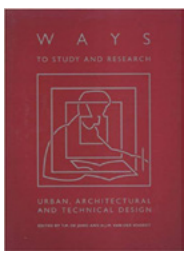
Central to this work is the transforming business-case of the public library from lending institute into social platform at the heart of the community, in this contributing to the ongoing processes of business transformation by public institutes. Accordingly, libraries develop and position themselves as facilitators of information exchange, where knowledge is gained but also created and shared – therefore requiring the innovation of services, programs and strategies.

Research on space

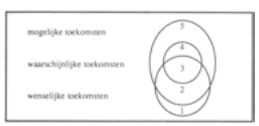
The type of research and the methodology needed for dealing with spatial aspects in context greatly depends on the knowledge domain of the specific academic-scientific field the research is embedded in, and on its goals. For instance, social scientists can understand space not as a neutral factor but as ‘relational space’, connecting the social and the spatial in the field of study of Spatial Sociology (e.g. Fuller & Low 2017). Examples are the studies on the social meaning of urban space (Low 2013) or, from a Cultural Anthropology viewpoint, the classical theory of Hall (1966) on proxemics. Spatial Economics, Environment-Behaviour Studies, Politics of Space are as well interested in spatial research from own disciplinary perspective, as many other disciplines also do.

This investigation is geared onto the knowledge domain of architecture and spatial design. In this domain research focuses on the characters of the physical space, its history and generative processes, its construction, materiality and a wide array of relationships with the cultural, socio-economic or political contexts through a large set of (hybrid) research and design techniques (Jong & Voordt eds. 2002). In the last decennia, a consistent body of knowledge emerged that consider design education and design research as specific scientific domains (e.g. Cross 1982; Lawson 2006) aiming to the investigation of future spatial configurations (thus ‘not yet existing’). Here the distinction between possible, desirable and probable futures (Jong 1992) establishes a framework of priorities for positioning ‘Research by Design’ as operative research methodology (e.g. Walsche & Komossa eds. 2016). Rather than the inductive or deductive reasoning, research by design adopts the abductive approach (inference to the best explanation) in defining and

E.T. Hall's proxemics. *Image, https://laofutze.wordpress.com*

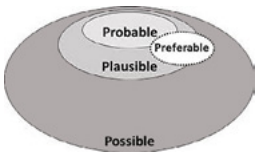


Architecture and the Built Environment as scientific field at the TU Delft: *Ways to Study and Research*. *Jong & Voordt (2002).*



Relationships among possible, probable and desirable futures. *Jong (1992).*

Position of the 'plausible' between the domains of the 'probable' and the possible'. *Bengston 2017.*

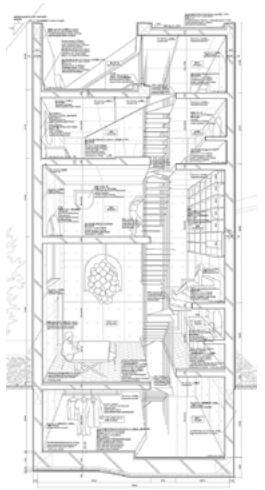


questioning plausible futures (Santaella 1997; Dorst 2010; Hougaard 2015). Beside the innovative, somehow risky and future-oriented research by design, however, there exist consolidated methods for spatial research that investigates existing spatial contexts with a variety of (analytical) lenses, like the historical or the typo-morphological research does.

In spatial research, mapping is a reliable method for collecting and comparing information in a nearly-objective way. Mapping makes it possible to describe the reality according to a set of chosen criteria and to render this information visible to others for interpretations (anatomy). Advancements in information and communication technologies make mapping also suitable for layering many different types of information and to read them on different media. The base of mapping lays in observation and measuring, to be integrated by other information sources and interviews, resulting in a set of (comparable) drawings and data at different scales.

This work adopts mapping as a strategy to build the hard-core information base on which to further elaborate through critical considerations and plausible speculations about the future of the performative library.

Graphic Anatomy. *Image, Atelier Bow Wow.*



Methodology

The investigation consisted of three distinct phases: A) survey; B) site-visits and mapping; C) critical considerations and challenges. During the investigation the research group has met several times in interdisciplinary validation meetings with KB. This included coordination and information exchange with a parent research project conducted by the Hogeschool Rotterdam (HR), as well in collaboration with KB, that focused on maker-space's contribution to programs for 21st century skills.

The investigation started by gathering information on the situation in public libraries in the Netherlands. At this end a survey was hold to enlighten diffusion and characters of makerspaces. The survey conducted by the KB (2018) collected information on a variety of aspects of library makerspaces. Questions inquiring the spatial / physical aspects of makerspaces were agreed beforehand with the ABE TUD research group. On the base of the response and of the gathered information, the selection was made of the following fifteen public libraries as representative of the typical (spatial) conditions in public libraries.

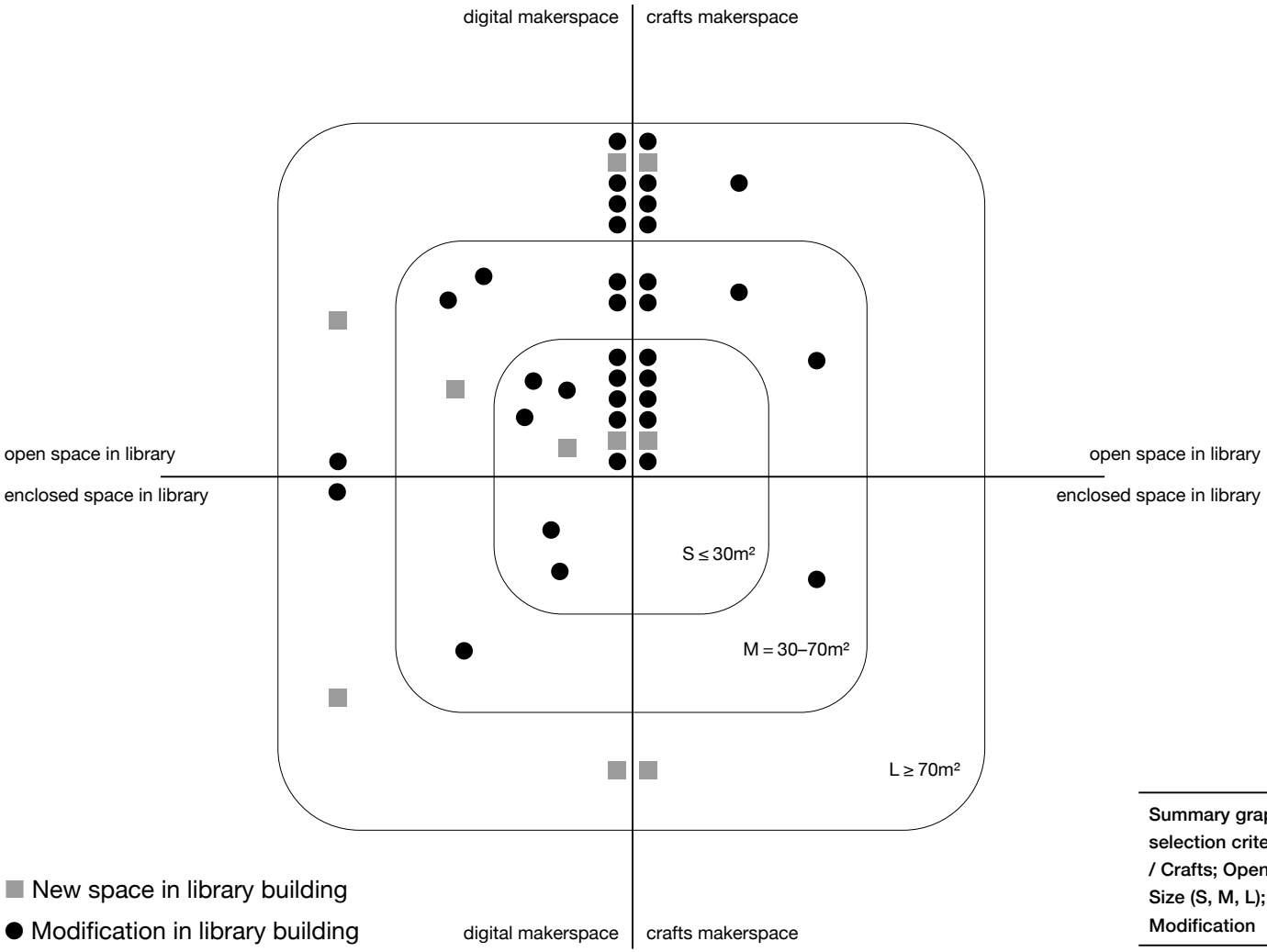
- Amsterdam Reigersbos
- Amsterdam Slotermeer
- Amsterdam Waterlandplein
- Apeldoorn
- Breda
- Eindhoven
- 's-Gravenzande
- Leeuwarden
- Middelburg
- Steenwijk
- Tiel
- Tilburg
- Utrecht
- Veenendaal
- Zwolle

Each visited makerspace is associated to a color.

In doing this, the main criteria were:

- Geographical spreading in Netherlands (not only the large cities)
- Size of the makerspace (S, M, L);
- Open of closed configuration (behind a door or not);
- Digital oriented or crafts oriented (innovation vs. creation);
- New or existing (refurbished) space in the library;
- Willingness to participate in a second stage of the investigation (site visit and interview).

Geographical spreading of visited locations across the Netherlands.

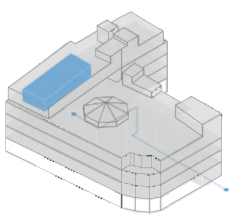


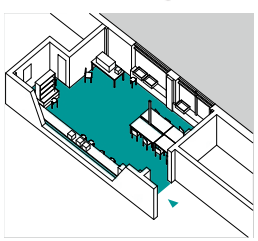
Summary graphic of the selection criteria: Digital / Crafts; Open / Closed; Size (S, M, L); New or After Modification

The selected libraries were contacted for preparing the site visits. Before a test-visit was conducted at the DigiLab of the Tilburg Library to sharpen and experiment the modalities for visiting and mapping. Tilburg was therefore added as the 15th case study.

The visit consisted of observation of makerspaces in operation, taking of photographs and sketches, notes on available equipment and spatial structures, interview with staff about origins, actual conditions, programs and ambitions. The staff also delivered drawings of the makerspace and of the library when possible. The site visits were concentrated in the most short possible time for avoiding seasonal conditioning. They took place within six weeks in March–May 2018.

Three levels of data in the Atlas: city; building; makerspace.





In the subsequent phase, the gathered information were elaborated graphically in comparable drawings (style, isometry and scale) consisting of three levels of data: the urban position; the library building; the makerspace. This information forms together the core of the Atlas of Performative Spaces in Dutch Public Library. This is an open collection of experiences that can be possibly extended to include other (future) experiences, and that is neutral in nature as it objectively reports the observed / measured data.

In the final part of the research, the mapping informed a comparative analysis of the observed experiences to enlighten generic and specific spatial characters of makerspaces in the context of the Dutch public library. This chapter has a raising speculative content. Indeed, a rather factual comparative analysis is followed by interpretations, critical discussion and considerations suggested by the observed conditions, and projected against available (comparable) information and disciplinary (spatial) knowledge. Finally, a set of challenges on the future of the makerspace in library context is proposed moving from an ABE TUD internal brainstorm informed by the made observations and considerations.

These challenges have a speculative nature and originate from an abductive reasoning. Altogether, this part can be considered as an agenda for spatial / design research on the future of makerspace in library context.

The preliminary results were shared with an expert's panel representative of the library and makerspace community in the Netherlands, including scientists, librarians, managers and designers. This happened in a workshop at the ABE TUD in which the challenges and the results from the research were discussed. The Expert's Panel consisted of:

- Reda van der Putten (Bibliotheek Eemland, regio Amersfoort) ;
- Peter Troxler (Hogeschool Rotterdam);
- Eva Visser (Hogeschool Rotterdam);
- Mirjam Albers (Cubiss);
- Ingrid de Jong (Cubiss);
- Carola Oortwijn (Rijnbrink);
- Emma Bijl (Rijnbrink);
- Jeroen de Boer (Bibliotheekservice Friesland);
- Aan Koostra (Bibliotheekservice Friesland);
- Jantien Borsboom (Digilab Bibliotheek MB);
- Elvira Caneda Cabrera (Bibliotheek-Informatiesector);
- Fedele Canosa (architect Mecanoo);
- Marianne Hermans (KB);
- Olindo Caso (TU Delft);
- Joran Kuijper (TU Delft).

Expert's Panel workshop at ABE TUD. *Kuijper.*

Targets

This investigation gathers a set of data and spatial information on the phenomenon of makerspaces in public libraries and make them available to the public. It is the first of its kind in the Netherlands. It addresses public libraries in the first place, by enlightening the present state-of-the-art in the spatial aspects related to the introduction of performative spaces in library context and the possibility of future developments. In the second place, the research addresses designers entrusted with the task of re-envisioning the ‘next’ public library at the brinks of on-going transformations. For them, the research aims to clarify and present the specificity and diversity of conditions when the library transforms itself from place of information consumption (collections oriented) to place of information production (making oriented). The full understanding of this transaction is a crucial challenge for the design of the contemporary public library. Finally, the research addresses the academic community of researchers and students which are concerned with the understanding and redefinition of the library as public realm and as pro-active urban agent. In this context this work adds to the body of knowledge by contributing empirical data and speculative vision on possible (desirable?) futures.

Disclaimer

A number of modification took place since our visits in Februari–April 2018. New Tilburg library at LocHal is now open; the makerspace at Middelburg library is moving to Vlissingen; Steenwijk and Apeldoorn are relocating in the same building; and more. The investigation necessarily picks a moment in time, yet the learned lessons remain valid.

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The Atlas

Joran Kuijper

The following tables show the mapping of the fifteen visited makerspaces. All drawings have been done by Joran Kuijper. The tables move from large to small (scale), typically addressing:

- the scale of the urban area (position and general societal key-data);
- the scale of the hosting (library) building with makerspace's position, along with information about makerspace orientation and floor-space ratio;
- the scale of the makerspace itself, including data on programs / tools, size, and the available square meters per person (capacity);
- the visual dimension of the visited situation, including position in the urban context, the hosting building and the makerspace interiors.

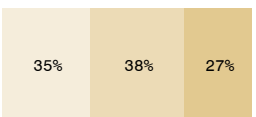
The position of the library in the urban context is shown by the city plan including relevant landmarks as for instance the train station, where possible. The hosting (library) building and the makerspace are represented by comparable isometric drawings. The visual dimension is illustrated by photographs taken at the time of the visits. Each makerspace has been associated to a color in order to render it distinguishable. Color-association has further no other meaning. A summary table of the spatial configurations of (library) buildings and makerspaces conclude the Atlas. The information sources for the mapping have been: A) direct observations and measurements during the visit; and B) materials like building (floor)plans / sections supplied by the makerspace / library staff, if available.

Tilburg

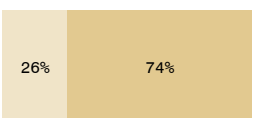
The library is part of a larger office building of the municipality but has its own entrance. In 2019 the library will move close to the train station, as part of the 'spoorzone' urban project.

population CBS, 2018	21.552
area CBS, 2018	119,15km²
population per km² CBS, 2017	1824
annual household income CBS, 2014	€ 30.200

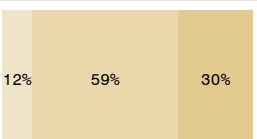
education level
CBS, 2011
- low educated
- middle educated
- highly educated

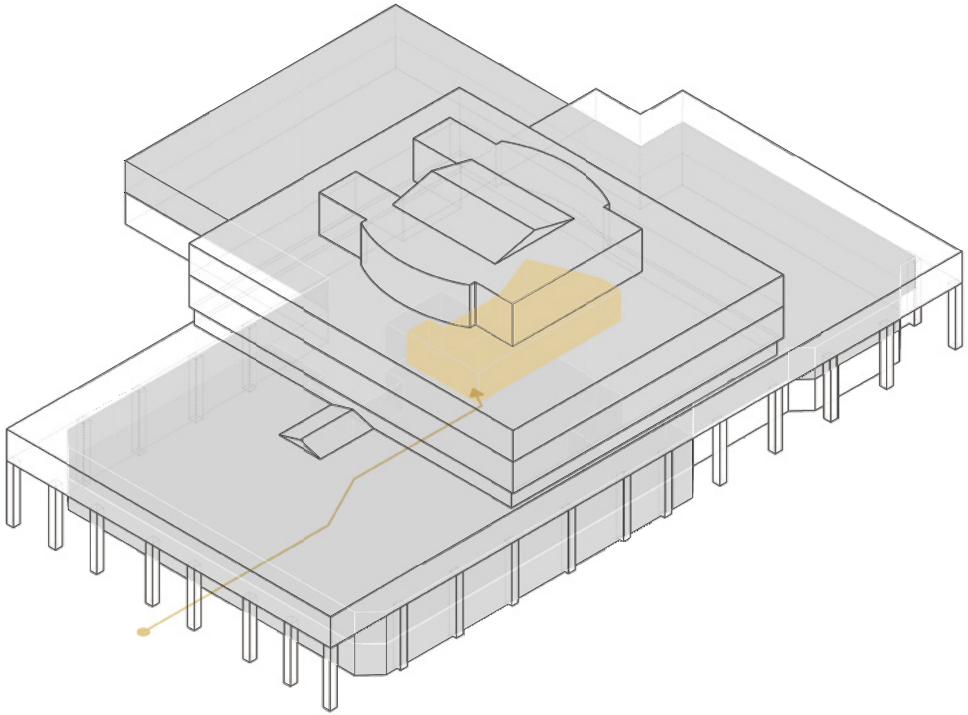


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service

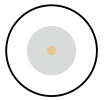




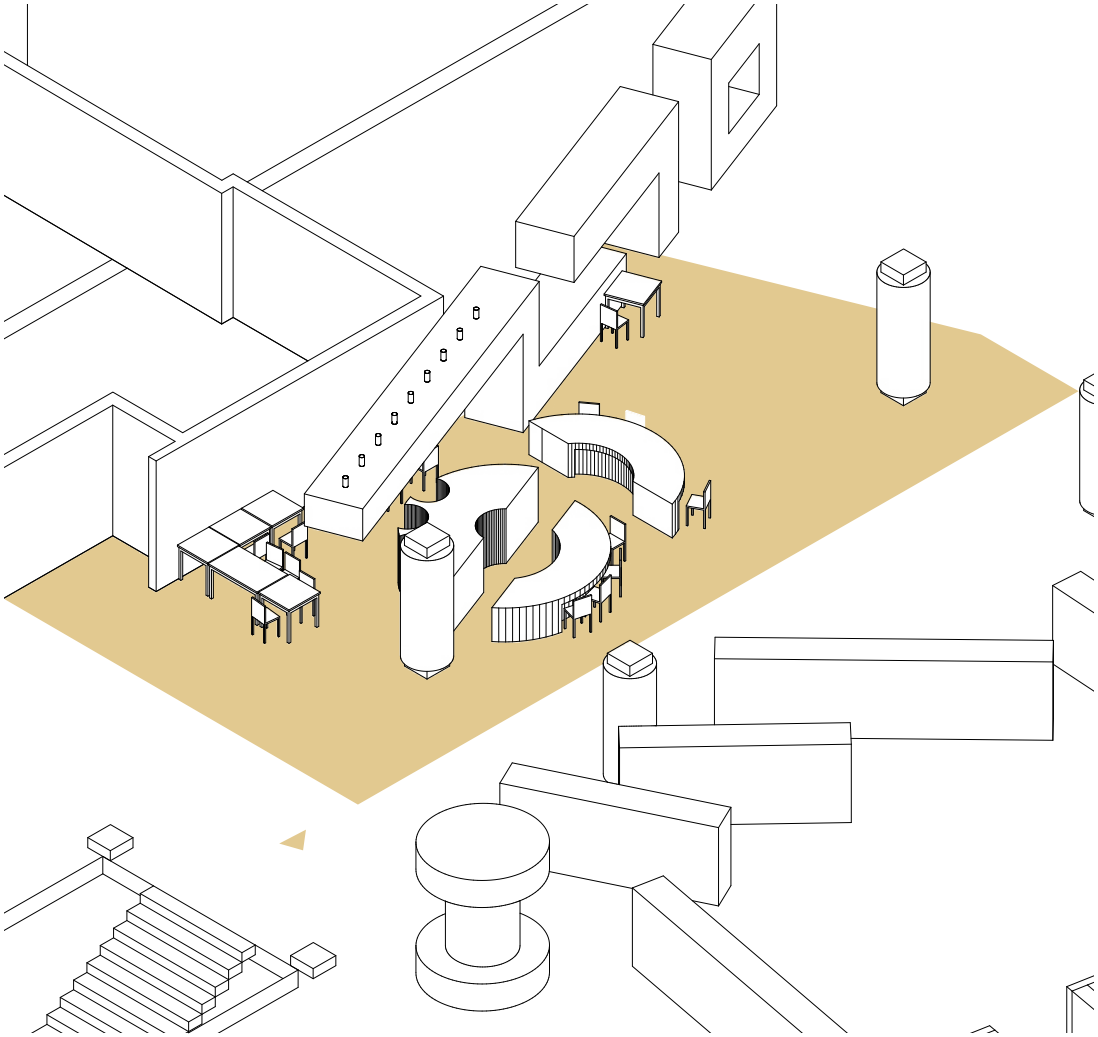
Bibliotheek Tilburg

The makerspace is on the first floor as an open space between the collections. It is in the library often seen by visitors as the information desk and it is the only visited makerspace offering knowledge about open source software and cryptocurrencies.

scale	M
space	open plan
arts and crafts	
twenty-first century skills	
floor area	



building	15.038 m^2
library	4.451 m^2
makerspace	152 m^2



Digilab

The makerspace has its own VR-Lab, but because of the makerspace's open configuration, this takes space from the collections. The (young) users produce quite some noise while using the VR possibilities.

workplaces	12

floor area

● makerspace	152	m^2
○ floor area per person	12,7	m^2

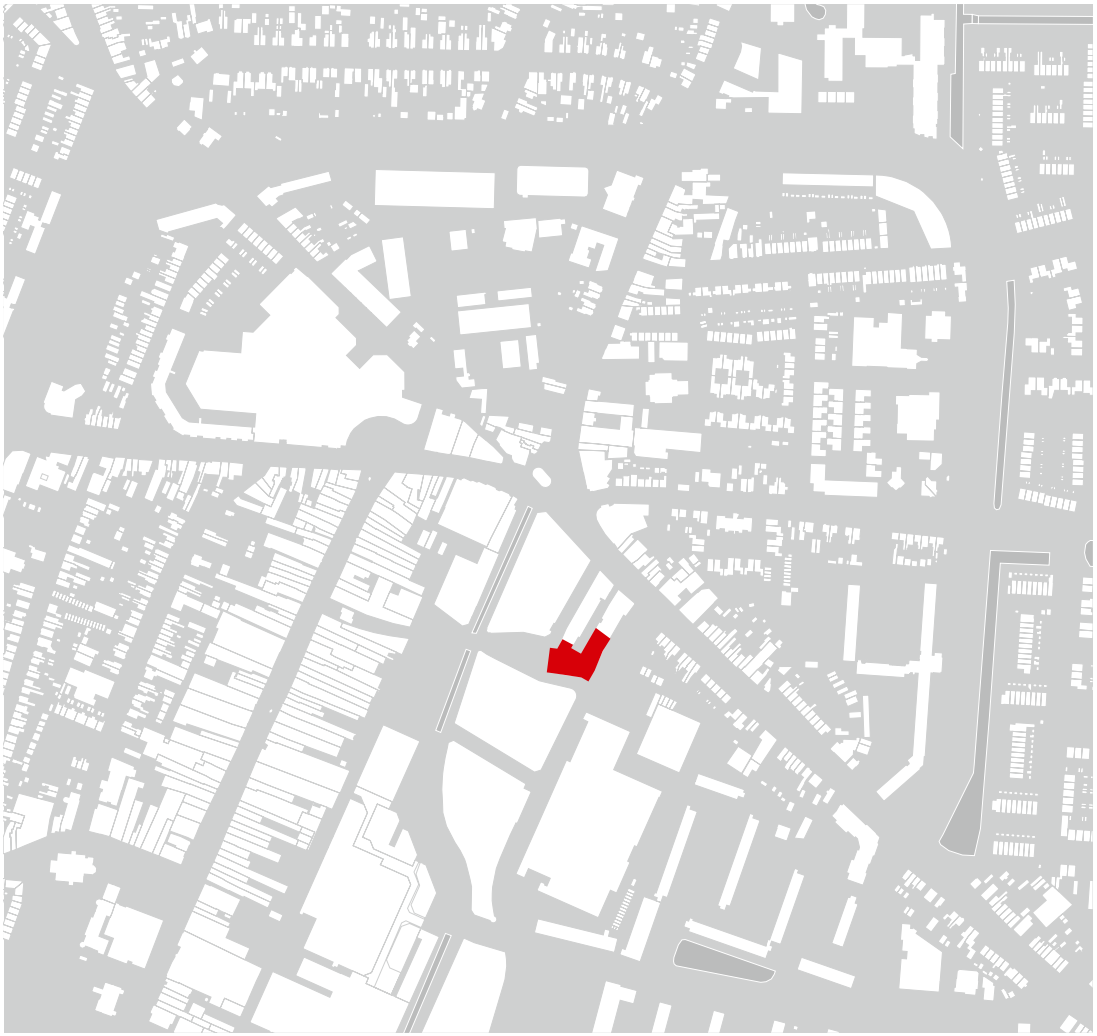
facilities

cooking and food		graphic design	
creative writing		game design	●
virtual reality	●	robotics	●
jewelery	●	3d drawing	●
textiles	●	3d scanning	●
music	●	3d printing	●
art		coding dojo	●
audio	●	vinyl cutting	●
video	●	2d laser cutting	●
materials		Lego	
		handicrafts	

building

library

makerspace

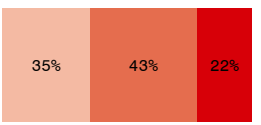


Veenendaal

The library is located in the Cultuurfabriek, a cultural center with a local historical association, art loan, the city's museum and a local culture foundation.

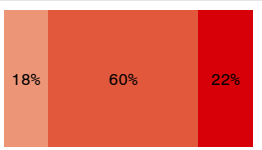
population CBS, 2018	64.918
area CBS, 2018	19,72 km²
population per km² CBS, 2017	3.299
annual household income CBS, 2014	€ 31.000

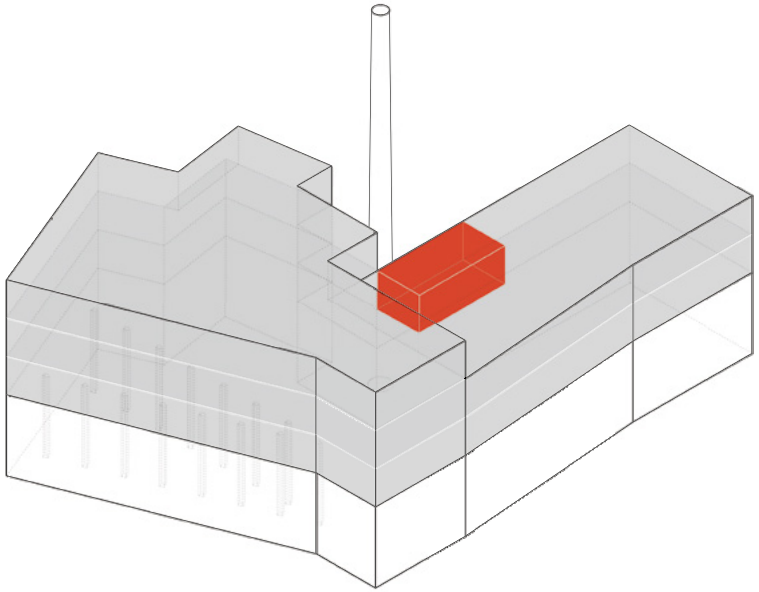
education level
CBS, 2011
- low educated
- middle educated
- highly educated



background
CBS, 2017
- migration background
- Dutch background

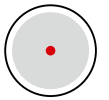
labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service



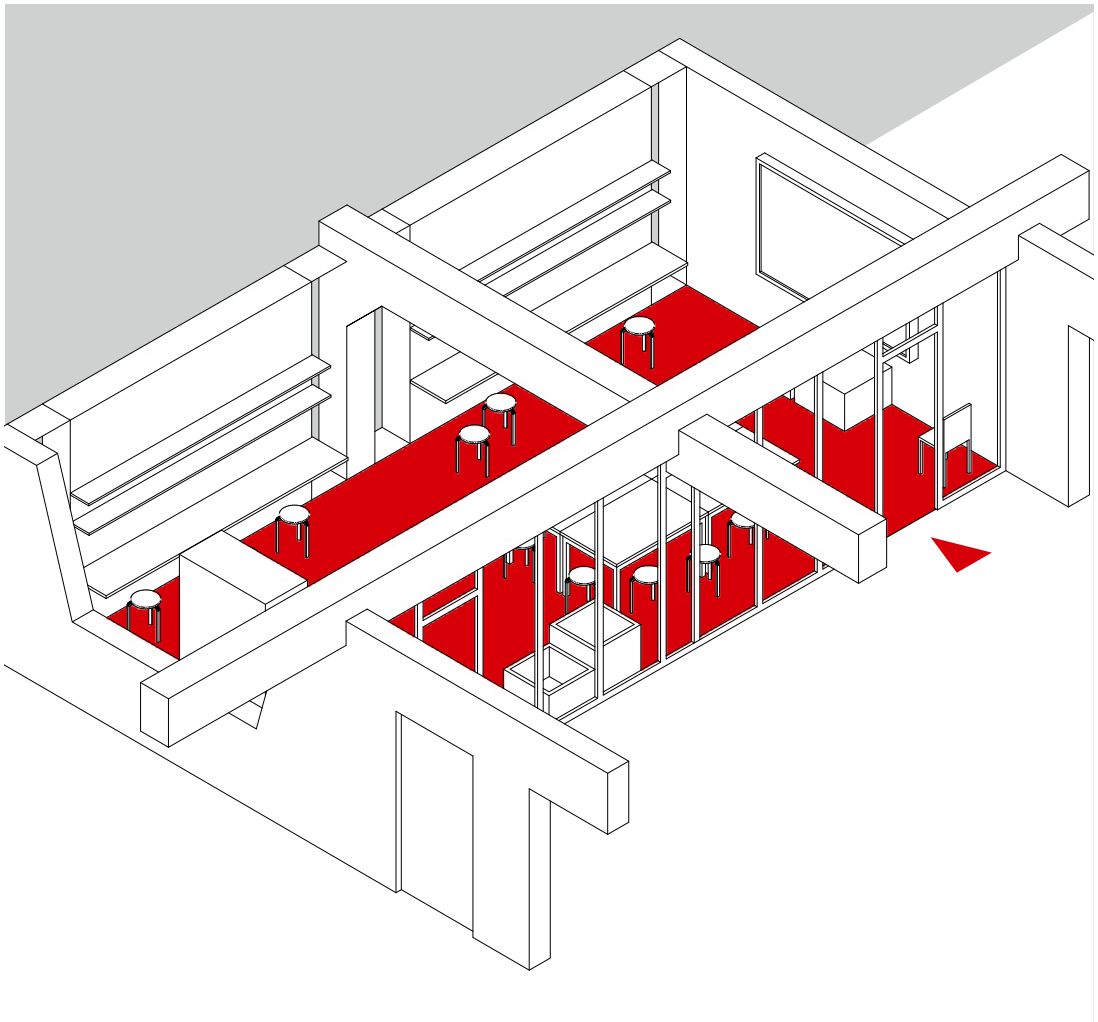


Cultuurfabriek Veenendaal

The first and the second floor of the building is the library. It contains special reading spaces for children and tutor rooms for (external) educational purposes. The makerspace is located in a former silent room wherein a glass front is placed.

scale	M
space	enclosed
arts and crafts	●
twenty-first century skills	●
floor area	

○ building	3.760 m²
● library	2.706 m²
● makerspace	42 m²



FabLab Veenendaal

For a relatively small space lots of equipment is available. Tough, because of its location there is not much of a run-up. Nevertheless the makerspace is recognizable as such because of this transparency.

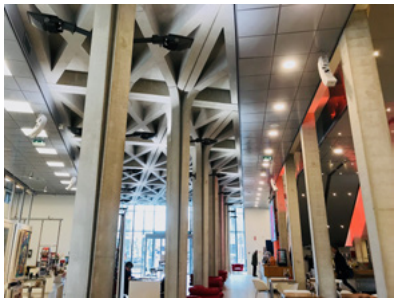
workplaces	15

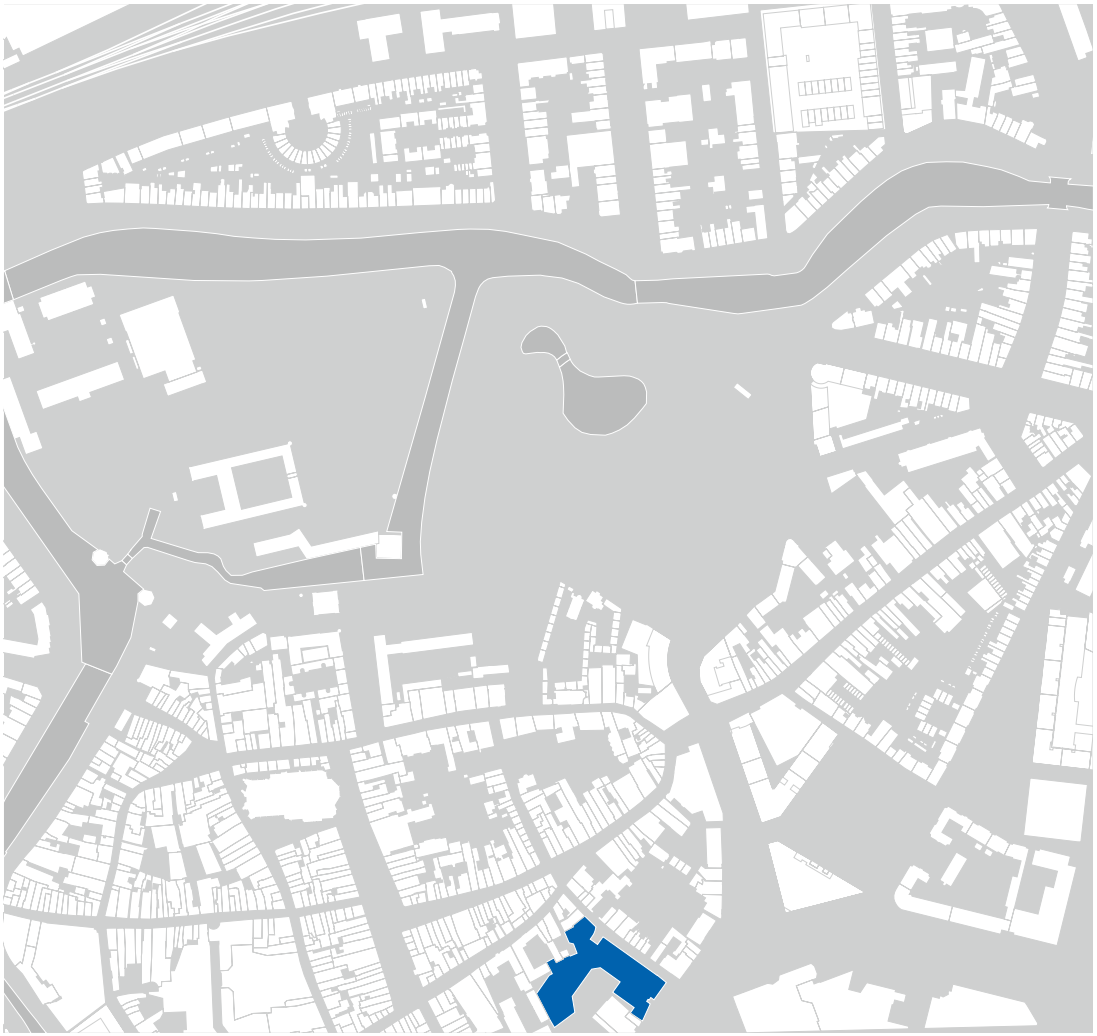
floor area

● makerspace	42	m^2
○ floor area per person	2,8	m^2

facilities

cooking and food		graphic design	
creative writing	●	game design	
virtual reality		robotics	
jewelery		3d drawing	●
textiles		3d scanning	
music		3d printing	●
art	●	coding dojo	●
audio		vinyl cutting	
video		2d laser cutting	●
materials	●	Lego	
		handicrafts	●



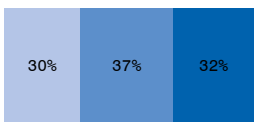


Breda

Together with a theatre, a music and art school the library is part of a cultural center. The vast collection is spread over two open space floor deepened wings on one level.

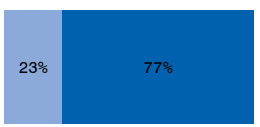
population CBS, 2018	183.448
area CBS, 2018	128,68 km²
population per km² CBS, 2017	1.447
annual household income CBS, 2014	€ 34.600

education level
CBS, 2011



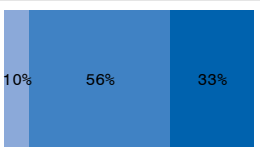
- low educated
- middle educated
- highly educated

background
CBS, 2017

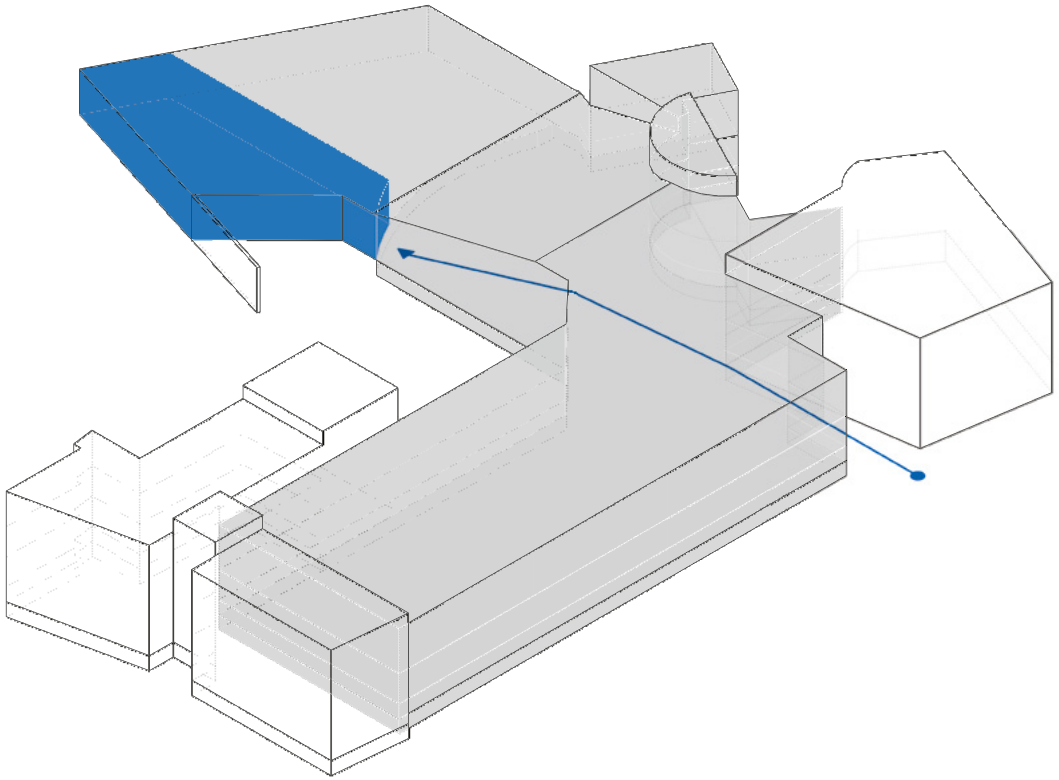


- migration background
- Dutch background

labor sectors
CBS, 2016



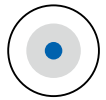
- industry and energy
- commercial service
- non-commercial service



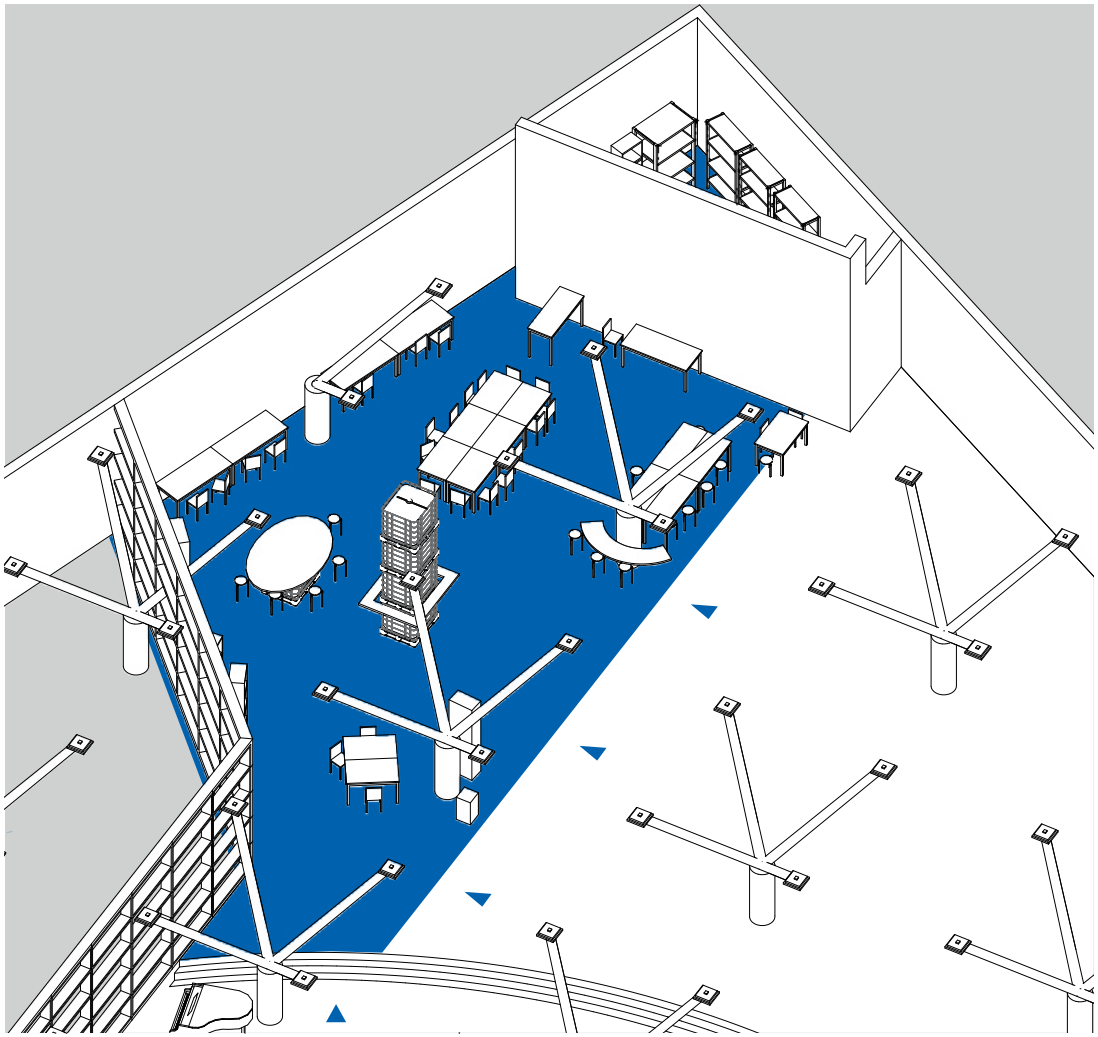
Bibliotheek Nieuwe Veste

The floor of the library is marked with colored tape pointing out the direction to the makerspace which is located as an open space between de collections. Natural light from the indoor enters the library quite well because of the large glass front.

scale	L
space	open plan
arts and crafts	●
twenty-first century skills	●
floor area	



○ building	6.979 m²
● library	2.514 m²
● makerspace	261 m²

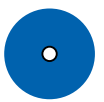


Makersbase

A hired artist created the furniture from reused material accommodating a fresh and ‘young’ look. Music and video is played during the opening hours. A large lockable storage space is available and is needed because of the makerspace’s open configuration.

workplaces	40

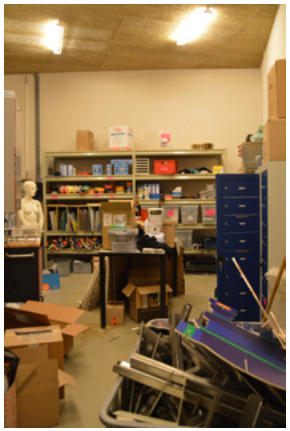
floor area



● makerspace	261	m^2
○ floor area per person	6,5	m^2

facilities

cooking and food		graphic design	●
creative writing	●	game design	●
virtual reality		robotics	●
jewelery	●	3d drawing	●
textiles	●	3d scanning	●
music	●	3d printing	●
art	●	coding dojo	●
audio	●	vinyl cutting	●
video	●	2d laser cutting	●
materials	●	Lego	
		handicrafts	



Eindhoven

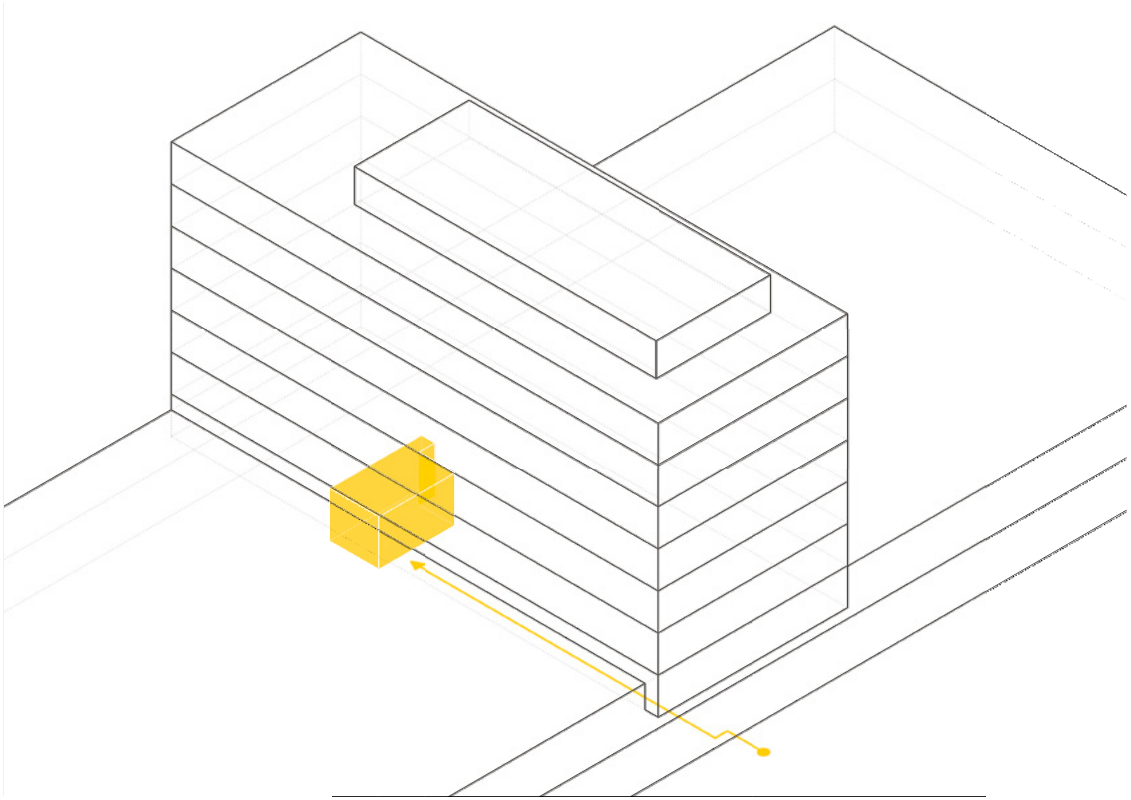
The makerspace is located in the Microlab, a creative industry building in an industrial area, far from the main location of Eindhoven's public library in the city center.

population CBS, 2018	229.126
area CBS, 2018	88,92 km²
population per km² CBS, 2017	2.587
annual household income CBS, 2014	€ 21.800

education level
CBS, 2011
- low educated: 33%
- middle educated: 36%
- highly educated: 31%

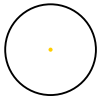
background
CBS, 2017
- migration background: 34%
- Dutch background: 67%

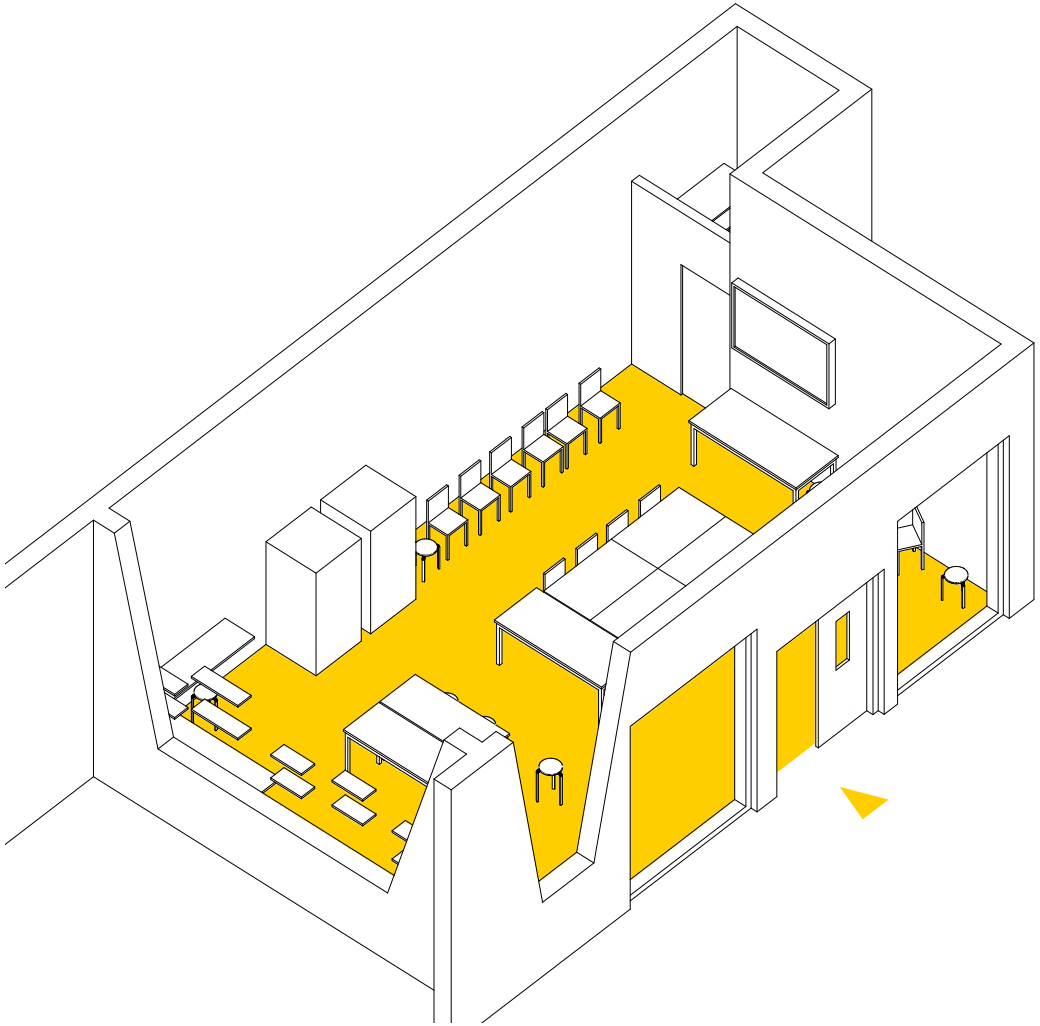
labor sectors
CBS, 2016
- commercial service: 59%
- non-commercial service: 27%
- onbekend: 14%



Bibliotheek Eindhoven

The room has no connection with the surrounding urban space and is only visible in the specific corridor of the building it is located in. Besides of one textual sign there is no recognizable connection with the (public) library.

scale	M
space	enclosed
arts and crafts	●
twenty-first century skills	●
floor area	
○ building	31.590 m^2
● library	not applicable
● makerspace	65 m^2



Microlab Strijp-S, Techniekbieb

The makerspace is a well lit, plain space equipped for both handicraft and digital purposes. A small lockable storage space is available. There is competition with a commercial makerspace close-by.

workplaces	20

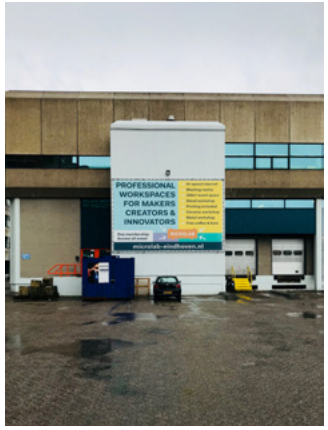
floor area

● makerspace	65	m^2
○ floor area per person	3,3	m^2

facilities

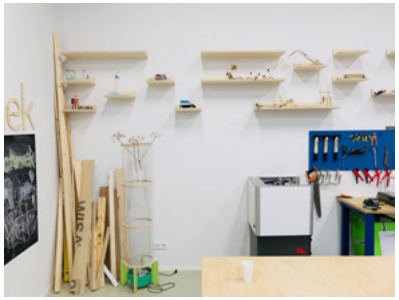
cooking and food		graphic design	
creative writing		game design	
virtual reality		robotics	●
jewelery		3d drawing	
textiles		3d scanning	
music		3d printing	●
art		coding dojo	●
audio		vinyl cutting	
video		2d laser cutting	●
materials	●	Lego	
		handicrafts	●

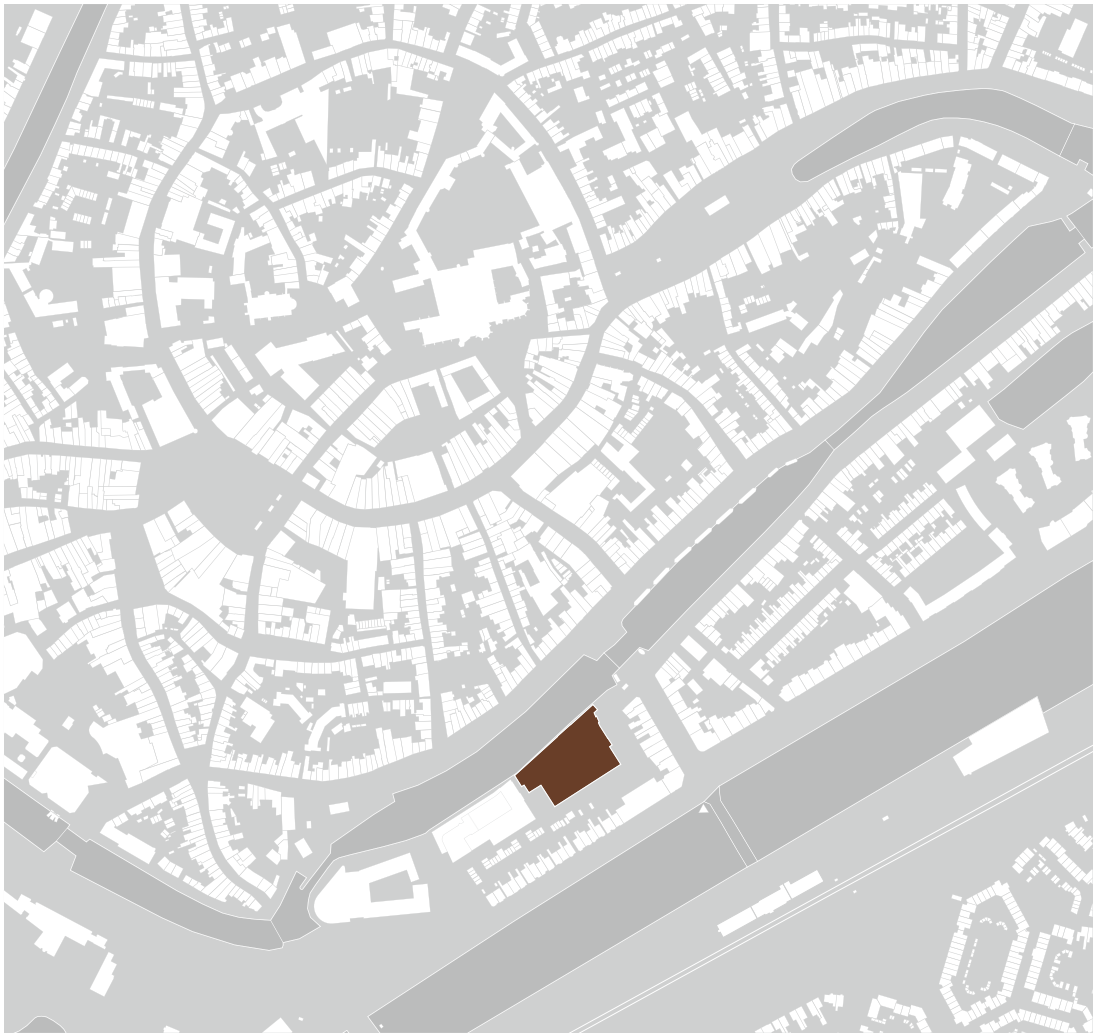
building



building (interior)

makerspace



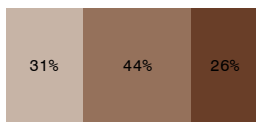


Middelburg

The library buildings hosts a planning office and an auditorium and is located on a waterfront with good views on the belt of the old city center.

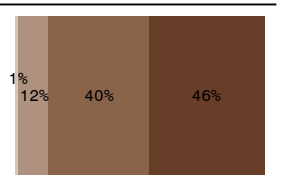
population CBS, 2018	48.303
area CBS, 2018	53,04 km²
population per km² CBS, 2017	991
annual household income CBS, 2014	€ 31.000

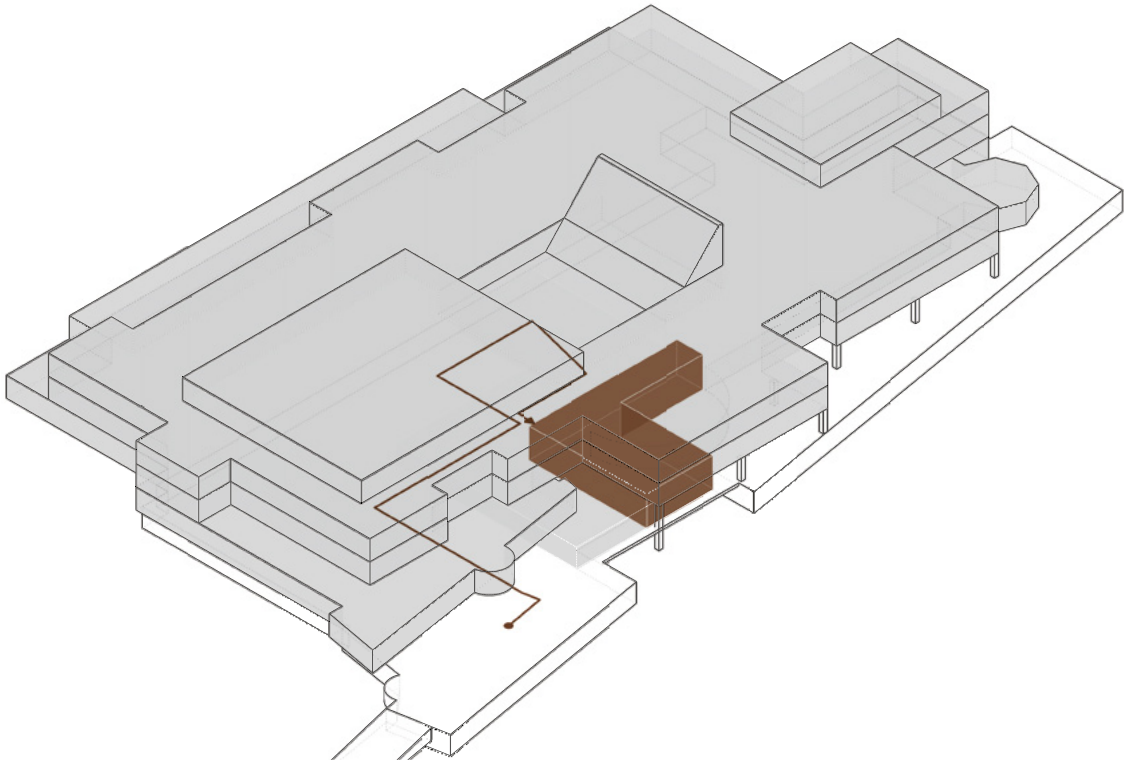
education level
CBS, 2011
- low educated
- middle educated
- highly educated



background
CBS, 2017
- migration background
- Dutch background

labor sectors
CBS, 2016
- agriculture, forestry and fishing
- industry and energy
- commercial service
- non-commercial service



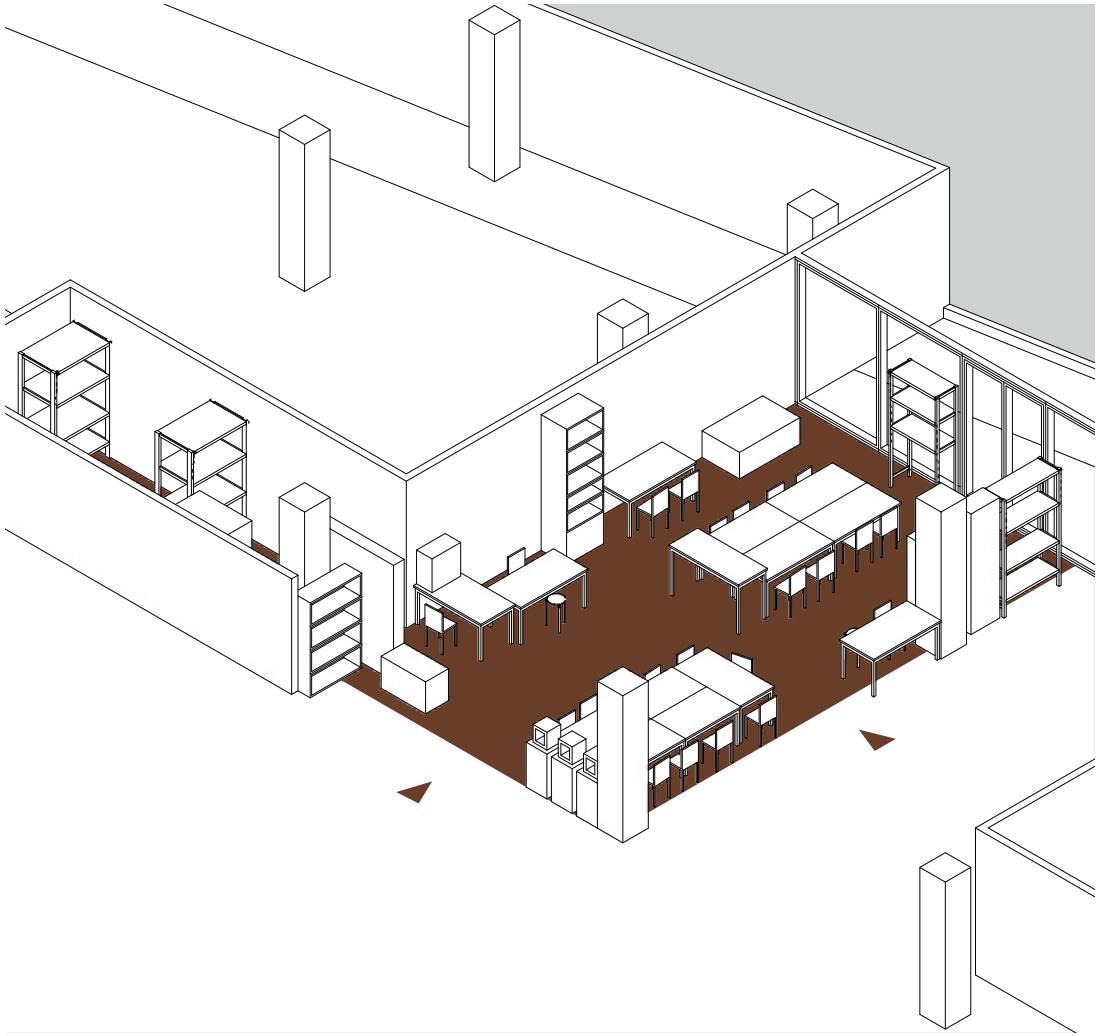


ZB Middelburg

The makerspace is located in the basement which is on the same floor as the auditorium. This seems a quite isolated location, but it offers a quiet space to work. Because of the open space configuration the makerspace is recognizable as such.

scale	M
space	open plan
arts and crafts	●
twenty-first century skills	●
floor area	

○ building	8.011	m^2
● library	5.632	m^2
● makerspace	98	m^2



Fablab Zeeland

From the other side of the water one could not recognize this part of the basement as a makerspace. There is a lockable storage room which is in need because of the open configuration.

workplaces	25

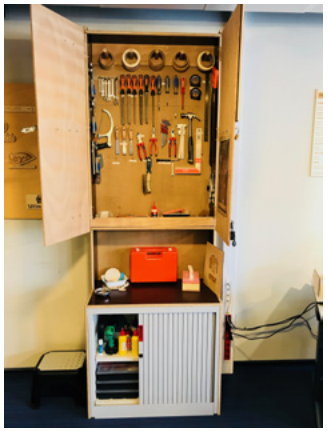
floor area

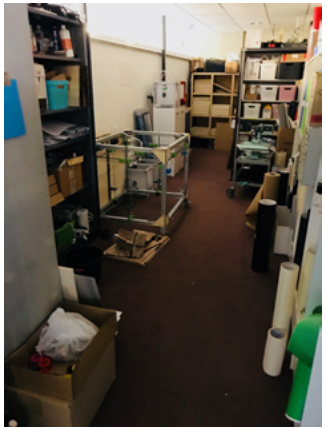
● makerspace	98	m^2
O floor area per person	3,9	m^2

facilities

cooking and food		graphic design	●
creative writing	●	game design	
virtual reality		robotics	●
jewelery		3d drawing	●
textiles		3d scanning	●
music		3d printing	●
art		coding dojo	
audio		vinyl cutting	●
video		2d laser cutting	●
materials	●	Lego	
		handicrafts	●

building | library | makerspace



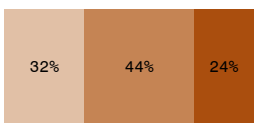


Apeldoorn

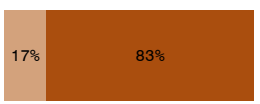
The two different buildings from two different decades form a multicultural center with a museum, archive and library.

population CBS, 2018	161.156
area CBS, 2018	351,15 km²
population per km² CBS, 2017	471
annual household income CBS, 2014	€ 31.900

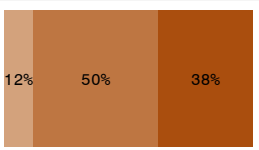
education level
CBS, 2011
- low educated
- middle educated
- highly educated

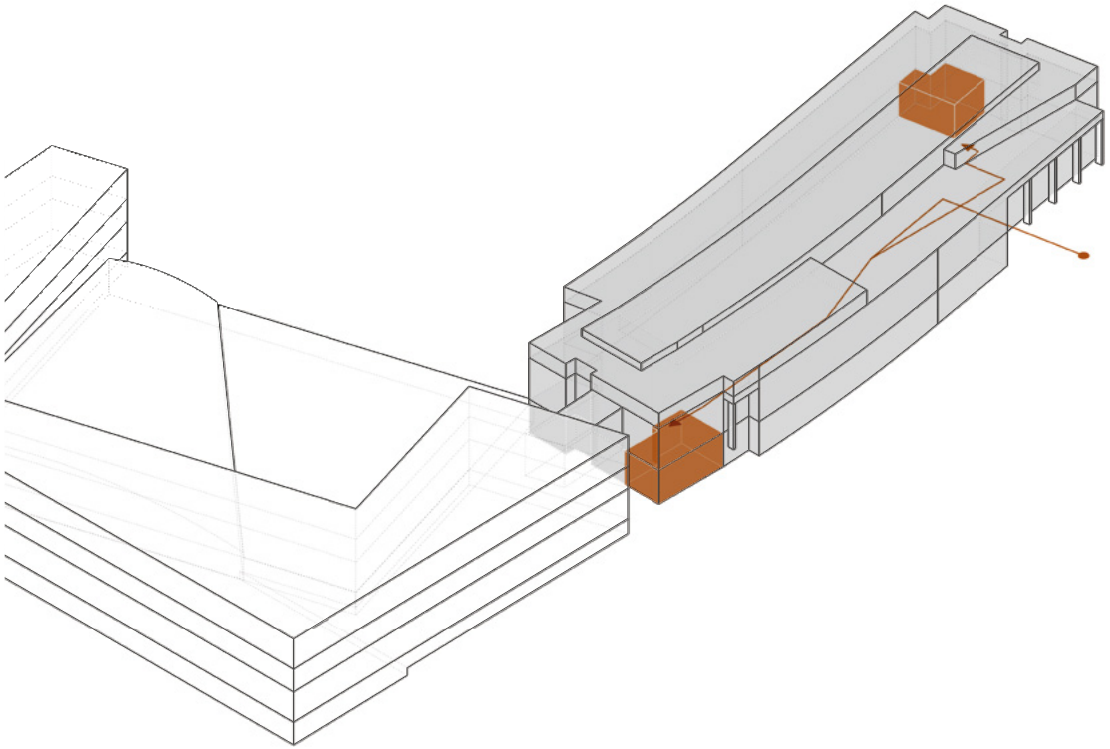


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service

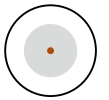




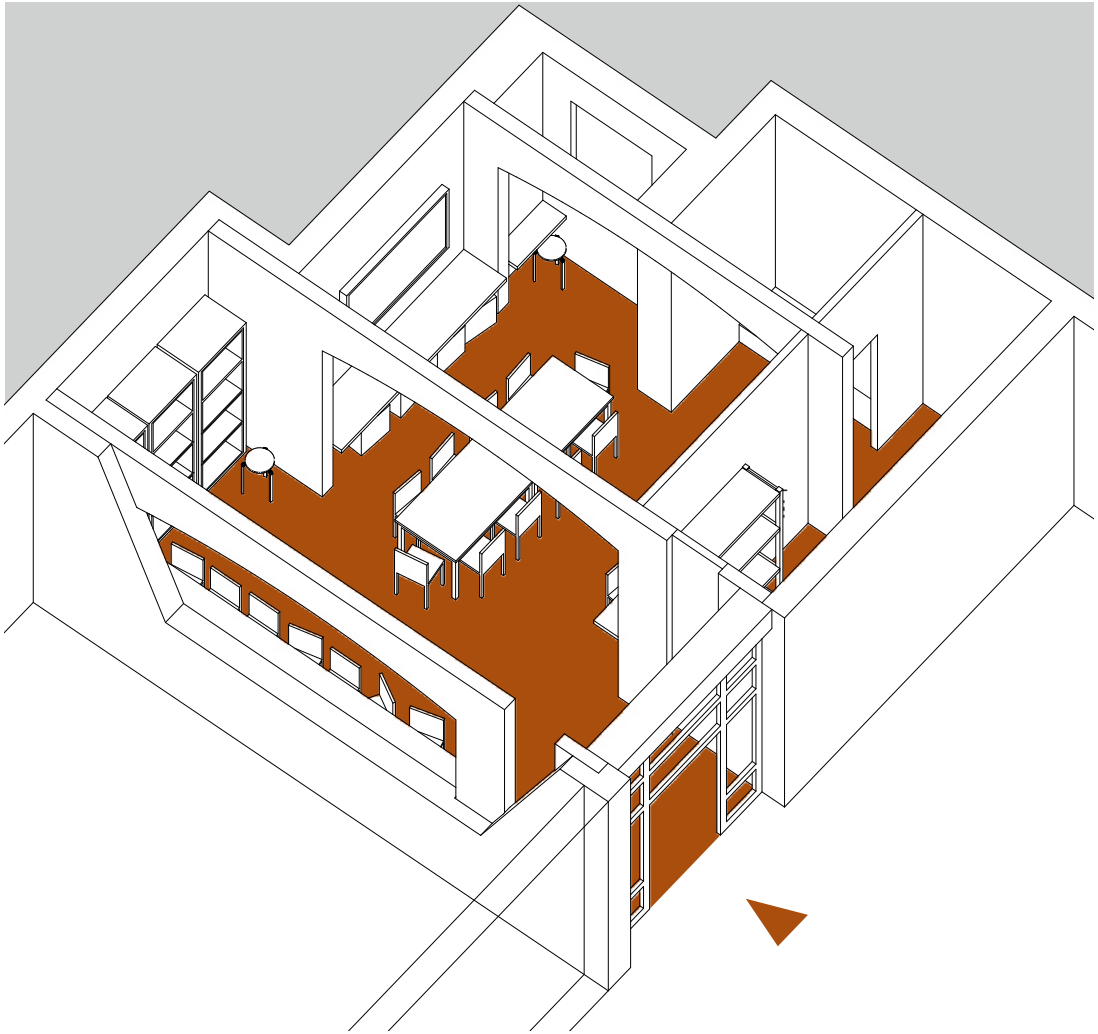
CODA Apeldoorn

One of the two connected buildings hosts the library and the archive. The makerspace and the VR Lab are in the basement and have no visual connection with the urban space. They are adjacent to the children's books and gaming area.

scale	L
space	enclosed
arts and crafts	
twenty-first century skills	●
floor area	



○ building	16.162 m^2
● library	5.580 m^2
● makerspace	94 m^2



CODA FabLab + CODA VRLab

The makerspace and the VR Lab are in different rooms far located from each other. The glass front and the large doors of the makerpace invite visitors to have a look. There is a lockable storage room available despite of the closed configuration.

workplaces	20

floor area

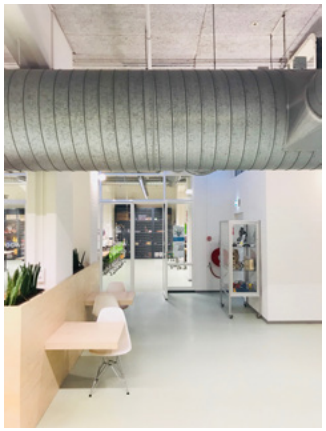
● makerspace	94	m^2
○ floor area per person	4,7	m^2

facilities

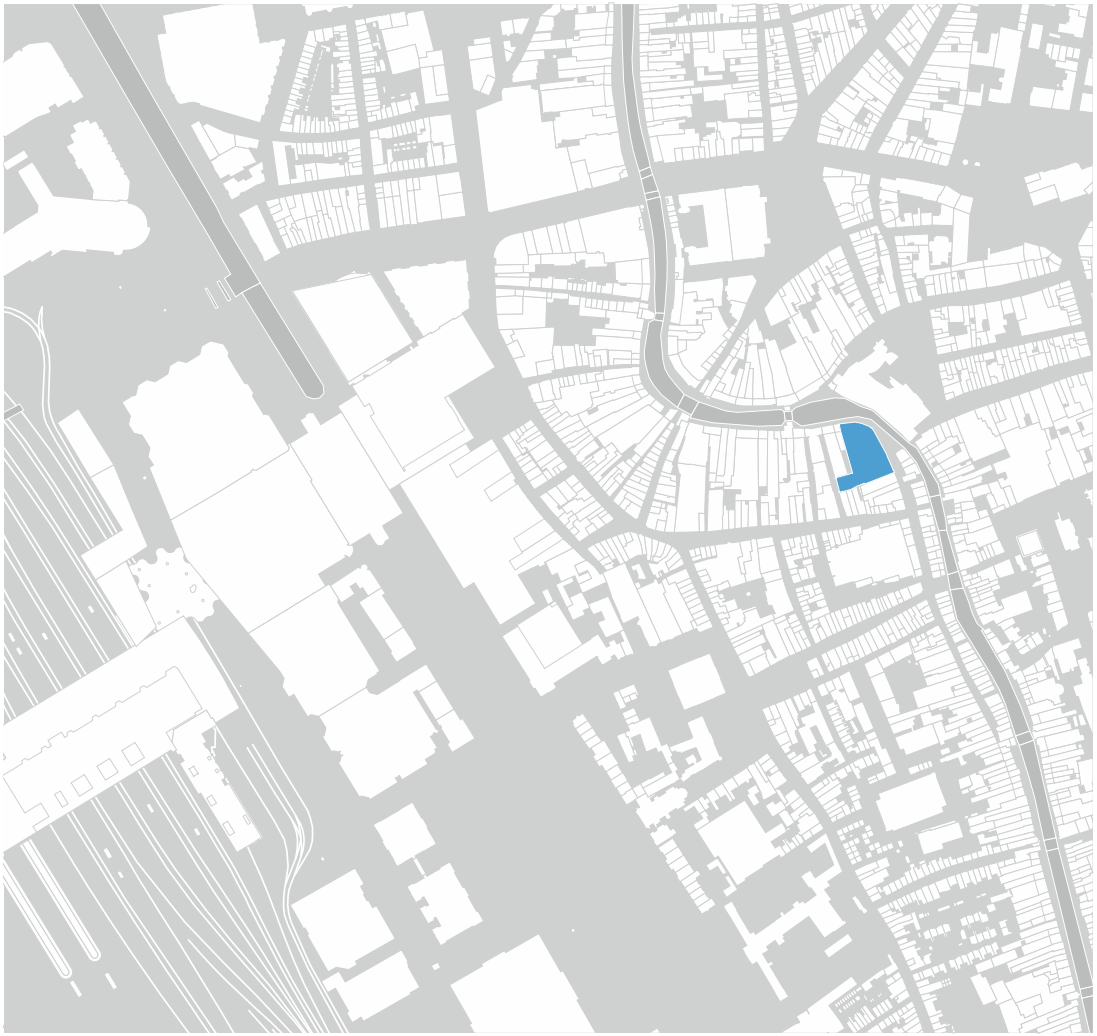
cooking and food		graphic design	
creative writing		game design	●
virtual reality	●	robotics	●
jewelery	●	3d drawing	●
textiles		3d scanning	●
music		3d printing	●
art		coding dojo	●
audio		vinyl cutting	●
video		2d laser cutting	●
materials		Lego	●
		handicrafts	●

building

library



makerspace

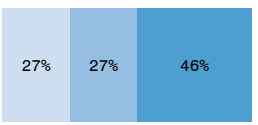


Utrecht

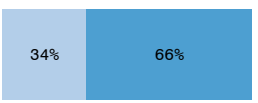
The reasonably old-fashioned furnished library (typical 80s Dutch renovation architecture) in Utrecht is in transition and will soon move to Neude, in the former monumental brick post office building.

population CBS, 2018	347.483
area CBS, 2018	99,21 km²
population per km² CBS, 2017	2.644
annual household income CBS, 2014	€ 36.600

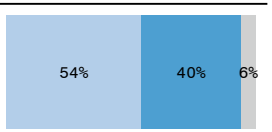
education level
CBS, 2011
- low educated
- middle educated
- highly educated

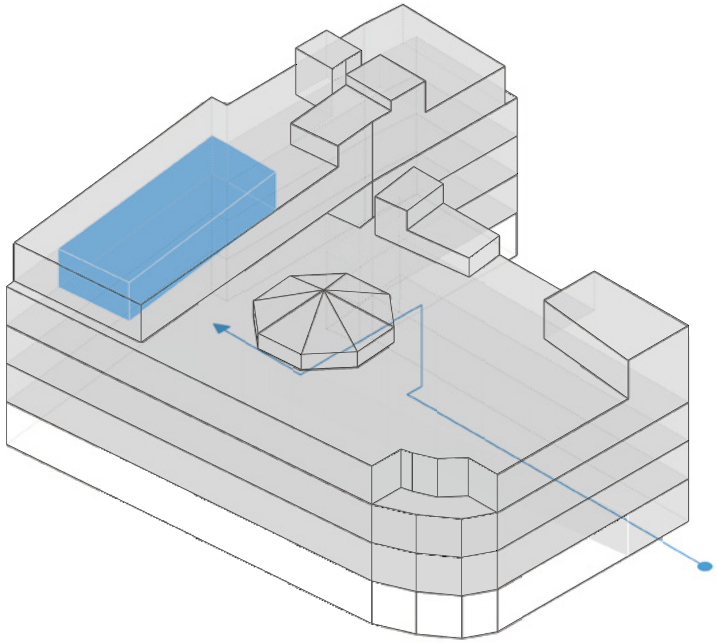


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- commercial service
- non-commercial service
- onbekend



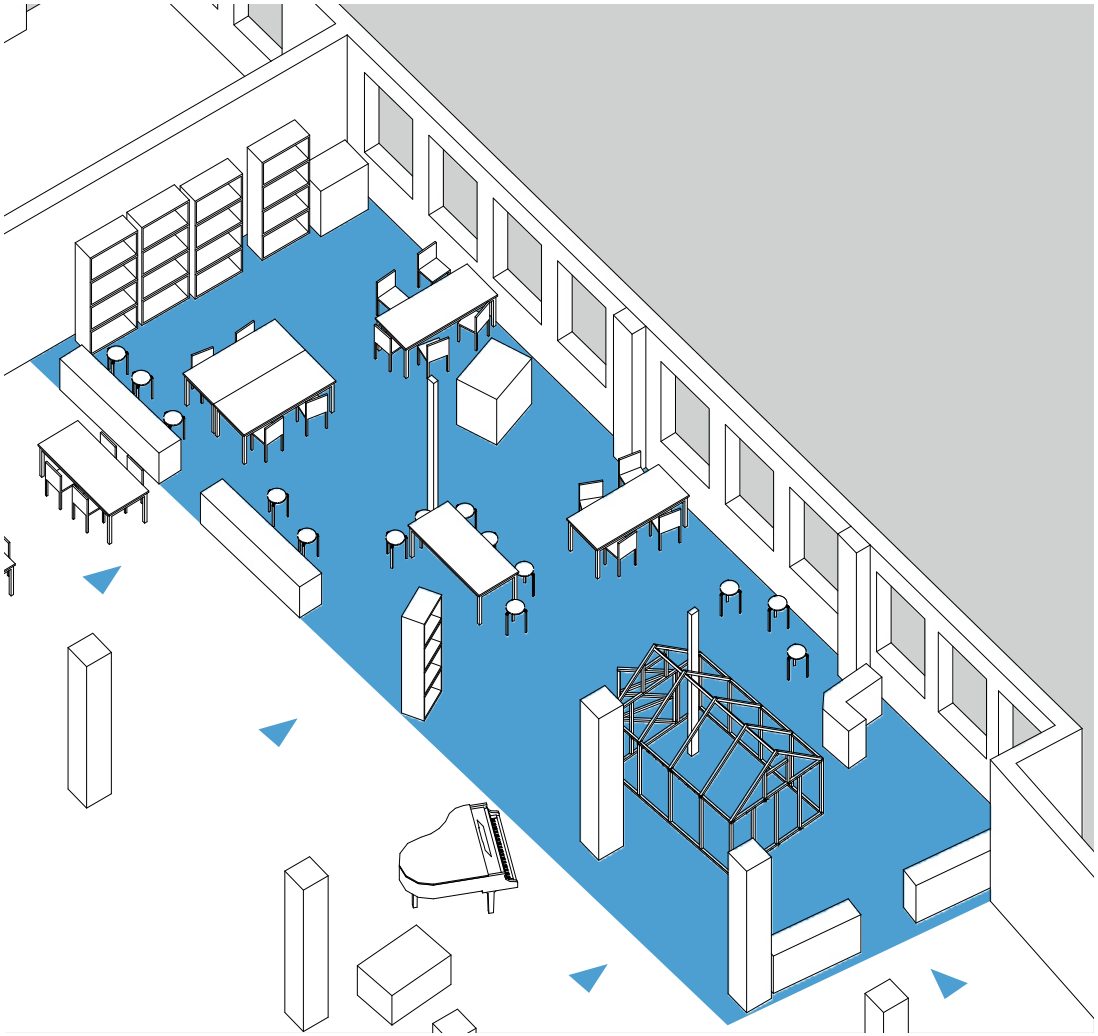


Centrale Bibliotheek

The makerspace is located on the top floor in a not strongly defined corner. The library shares the building with a large bookshop on the ground floor. Both functions have n own entrance.

scale	M
space	open plan
arts and crafts	●
twenty-first century skills	●
floor area	

○ building	6.310 m^2
● library	4.451 m^2
● makerspace	130 m^2



Laboratorium

The space is delimited by painted wooden cabinets and there is a greenhouse in the space that also serves as storage for some equipment when the makerspace is closed. There are large metal storage cupboards at the side in which the creations of visitors can be stored.

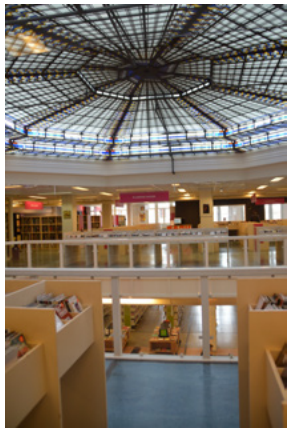
workplaces	15

floor area

● makerspace	130	m^2
○ floor area per person	8,7	m^2

facilities

cooking and food	graphic design	
creative writing	game design	
virtual reality	robotics	●
jewelery	3d drawing	●
textiles	3d scanning	
music	3d printing	●
art	coding dojo	●
audio	vinyl cutting	●
video	2d laser cutting	
materials	Lego	
	handicrafts	●

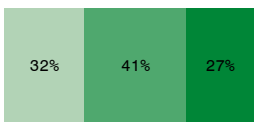


Leeuwarden

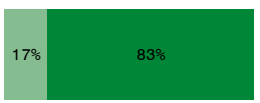
dbieb in Leeuwarden is part of a creative complex that used to serve as a penitentiary and shares the building with other creative companies like a bookbinding service and game design studios.

population CBS, 2018	122.415
area CBS, 2018	170,23 km²
population per km² CBS, 2017	704
annual household income CBS, 2014	€ 29.400

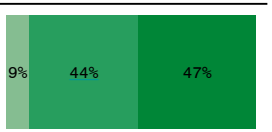
education level
CBS, 2011
- low educated
- middle educated
- highly educated

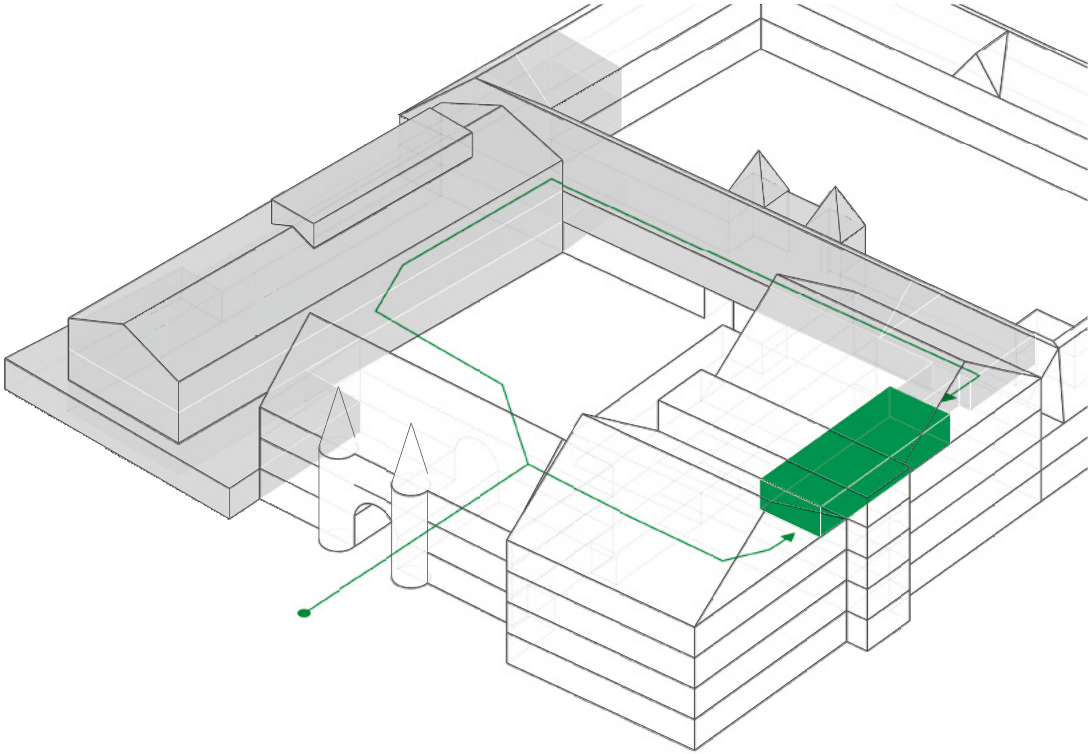


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service

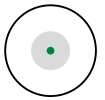




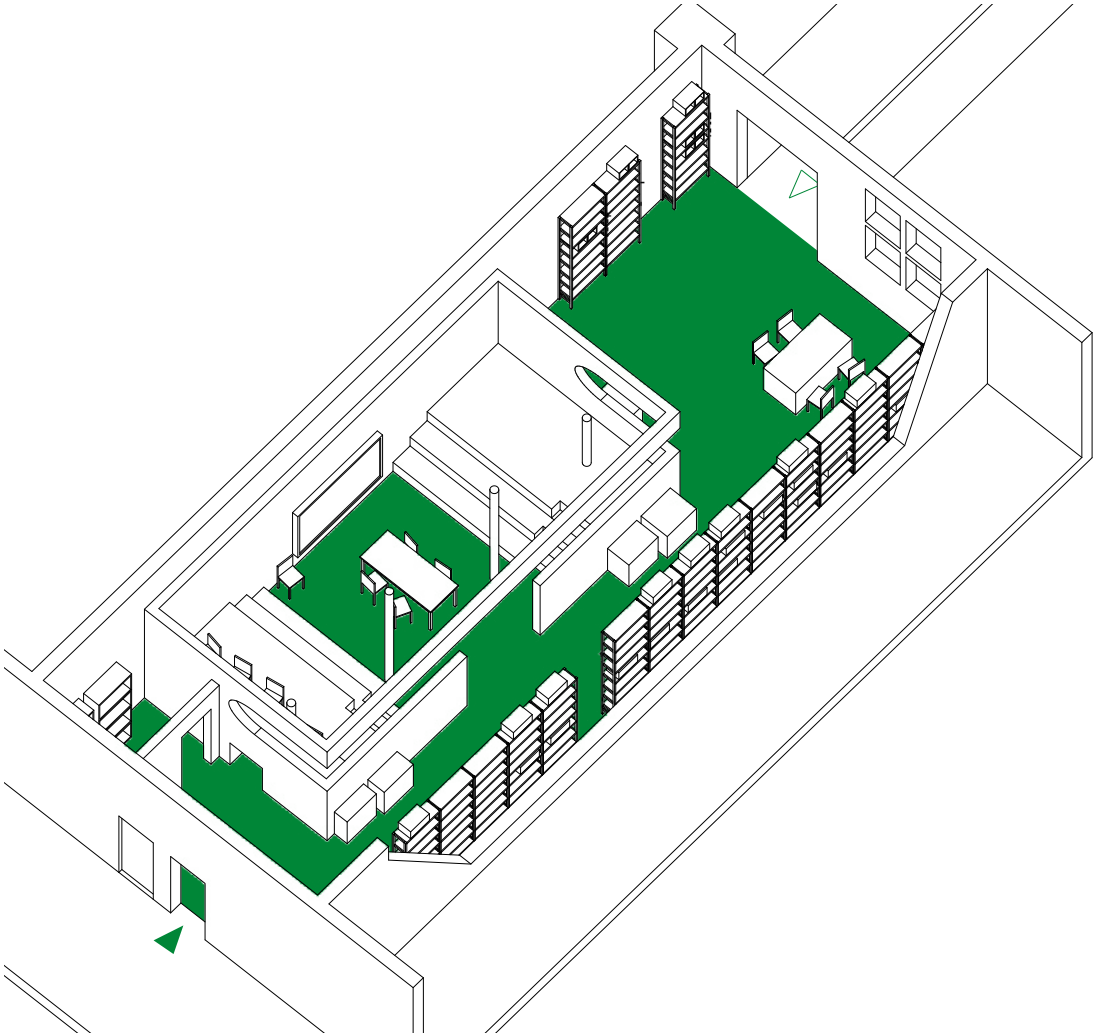
dbieb

The spatial layout is based on a linear route through the library part whereof the makerspace is located at the end. It makes extensive use of educational Lego. Ready-made projects are arranged through a collaboration with a local Lego dealer.

scale	L
space	enclosed
arts and crafts	
twenty-first century skills	●
floor area	



○ building	19.031 m^2
● library	3.513 m^2
● makerspace	139 m^2



Werkplaats

The maker's site makes extensive use of educational Lego as a means of transmission. Ready-made educational projects are arranged through a collaboration with a local Lego dealer. The green furniture piece can serve as a green screen and stage for Lego designed educational *robobattles*.

workplaces	15

floor area

● makerspace	139	m^2
○ floor area per person	9,3	m^2

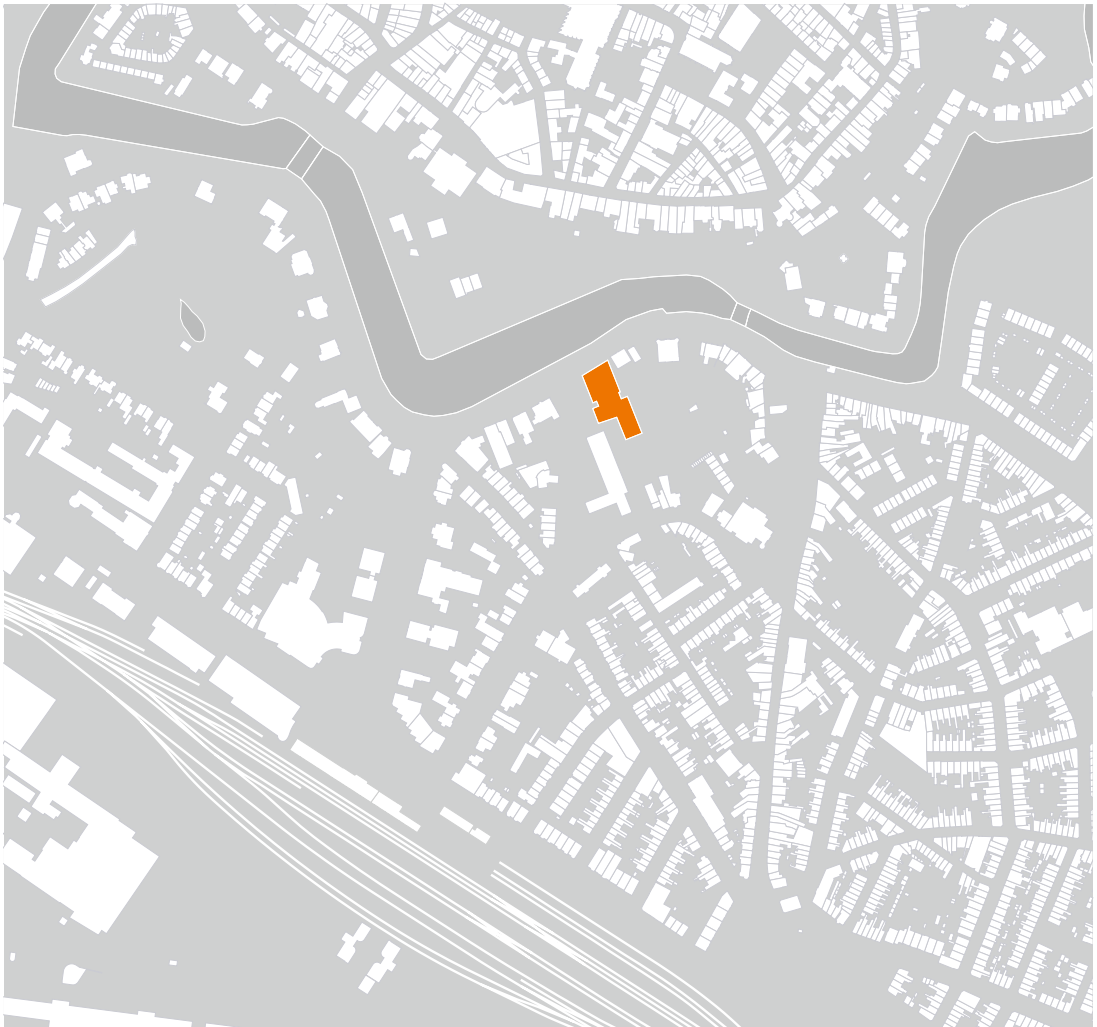
facilities

cooking and food		graphic design	
creative writing	●	game design	
virtual reality	●	robotics	●
jewelery	●	3d drawing	●
textiles		3d scanning	
music		3d printing	
art	●	coding dojo	●
audio	?	vinyl cutting	
video	●	2d laser cutting	
materials	●	Lego	●
		handicrafts	

building

library

makerspace

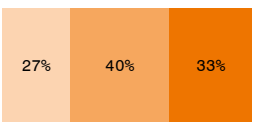


Zwolle

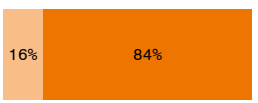
This library has been in 2018 awarded as ‘best library in the Netherlands’. It is an old office building that has been stripped and converted into a cultural living room in Zwolle.

population CBS, 2018	126.116
area CBS, 2018	119,36 km²
population per km² CBS, 2017	1.128
annual household income CBS, 2014	€ 32.200

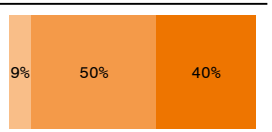
education level
CBS, 2011
- low educated
- middle educated
- highly educated

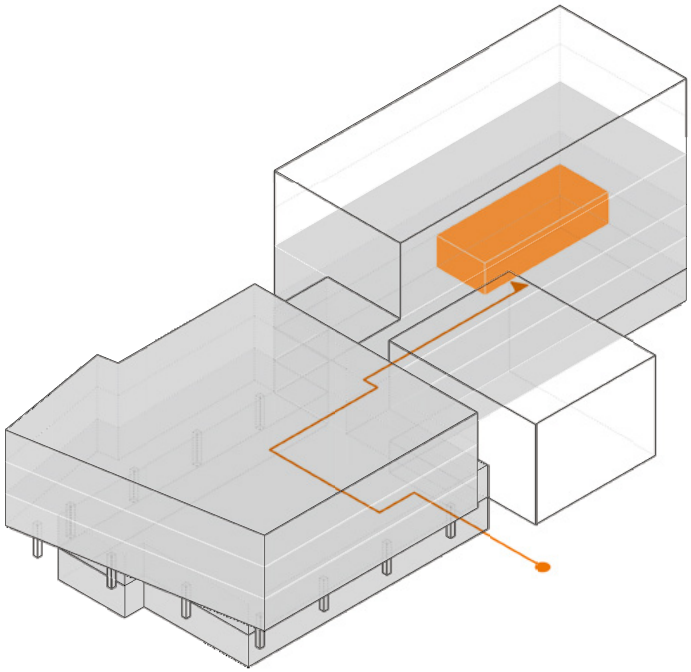


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service



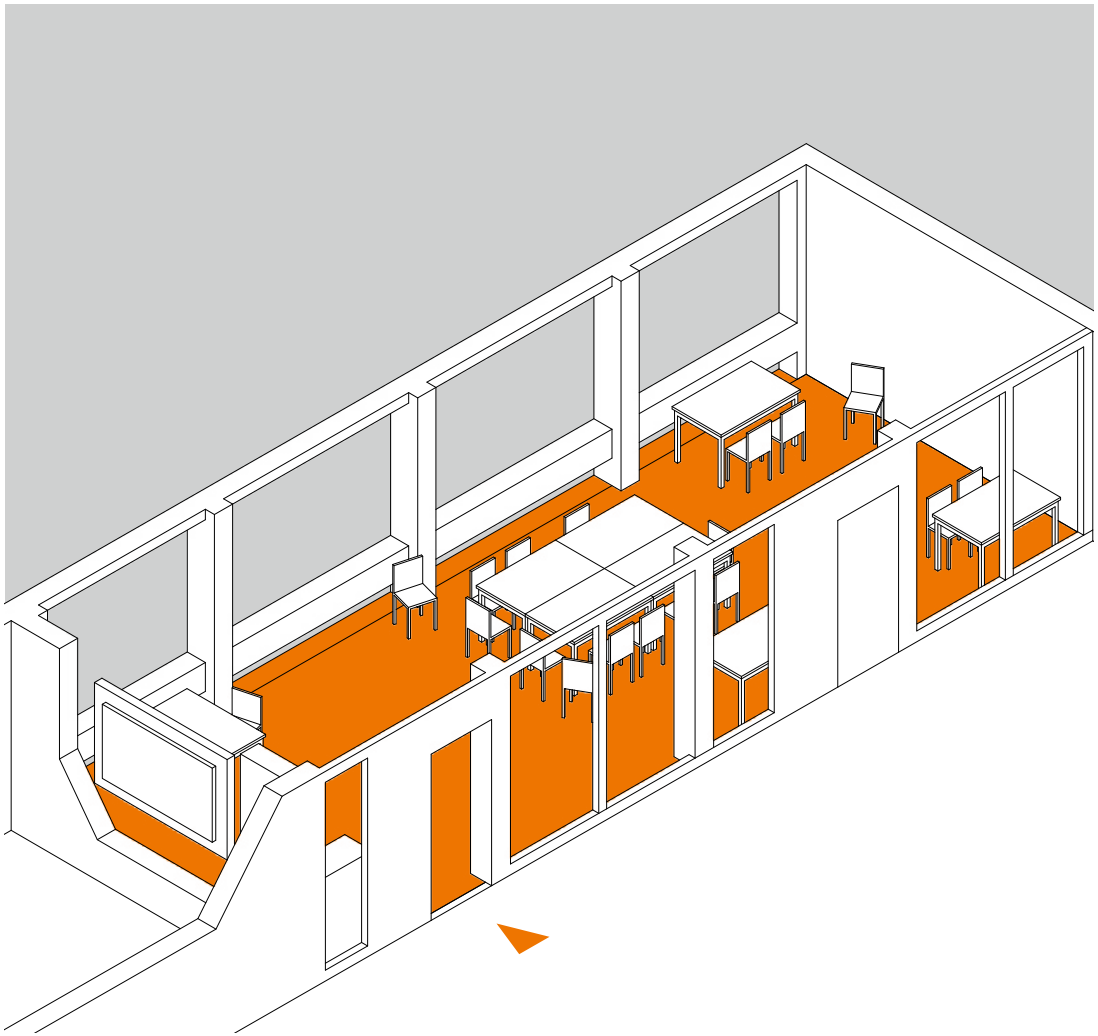


Stadkamer Centrum

The makerspace location in the library is not ideal. The originally chosen space had to make room for the machines to return books. It is a makerspace of medium size with no fixed program. There is plenty of daylight. It is located in a corridor among several similar spaces.

scale	M
space	enclosed
arts and crafts	
twenty-first century skills	●
floor area	

○ building	6.003	m^2
● library	4.645	m^2
● makerspace	70	m^2



Medialab

The lab contains only a large screen, VR possibilities and some 3D printers and focuses on digital skills. The approach of using the makerspace is *quid pro quo*. Use is only possible and allowed if you give something back to the Stadkamer, for example in the form of a workshop.

workplaces	15

floor area

● makerspace	70	m^2
○ floor area per person	4,7	m^2

facilities

cooking and food	●	graphic design	
creative writing	●	game design	
virtual reality		robotics	
jewelery		3d drawing	
textiles	●	3d scanning	
music	●	3d printing	●
art	●	coding dojo	●
audio	●	vinyl cutting	
video		2d laser cutting	
materials		Lego	
		handicrafts	

building

library

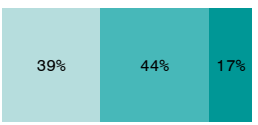
makerspace

Steenwijk

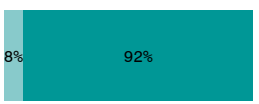
The library of Steenwijk is a small library that serves small villages in the region. Every Saturday morning the makerspace has an open walk-in.

population CBS, 2018	43.768
area CBS, 2018	321,59 km²
population per km² CBS, 2017	150
annual household income CBS, 2014	€ 28.400

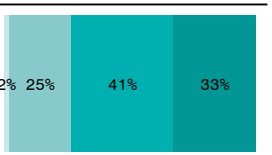
education level
CBS, 2011
- low educated
- middle educated
- highly educated

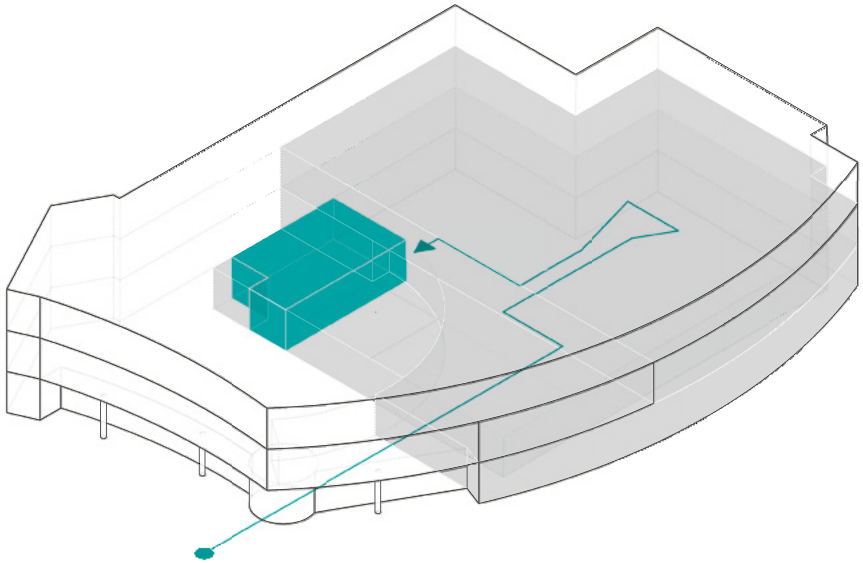


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- agriculture, forestry and fishing
- industry and energy
- commercial service
- non-commercial service



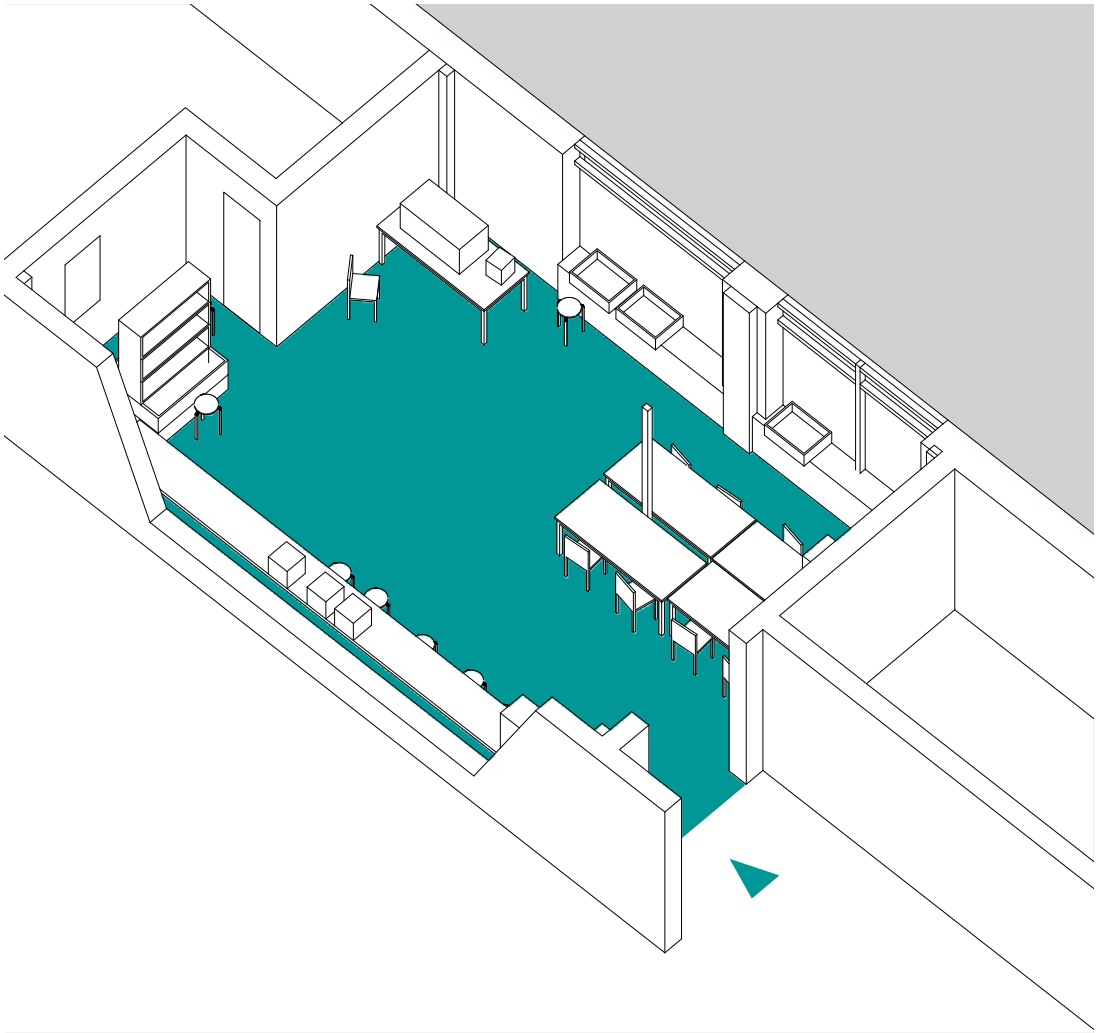


Bibliotheek Steenwijk

Because the library shares the same building with a bank, extra security is needed. The location of the makerpace is in the cellar where the windows are blinded by order of the bank. It is not easy to find it.

scale	M
space	enclosed
arts and crafts	
twenty-first century skills	●
floor area	

○ building	3.113 m²
● library	1.913 m²
● makerspace	58 m²



KennisLab

The standard collection of equipment is available. Besides of the open walk-ins programs are set up to receive groups. The employees are very passionate about the activities because of their personal affinity and are very much willing to help and think along with the visitors.

workplaces	10

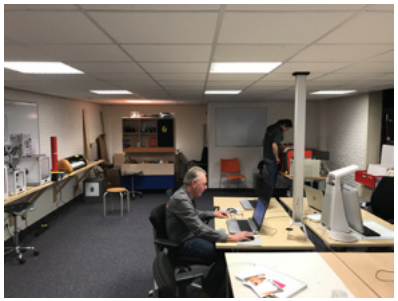
floor area

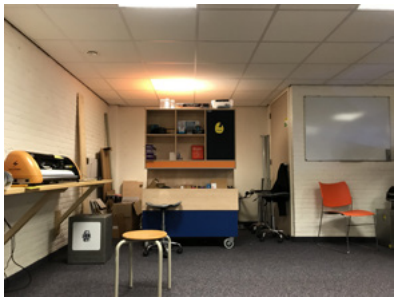
makerspace	58	m^2
floor area per person	5,8	m^2

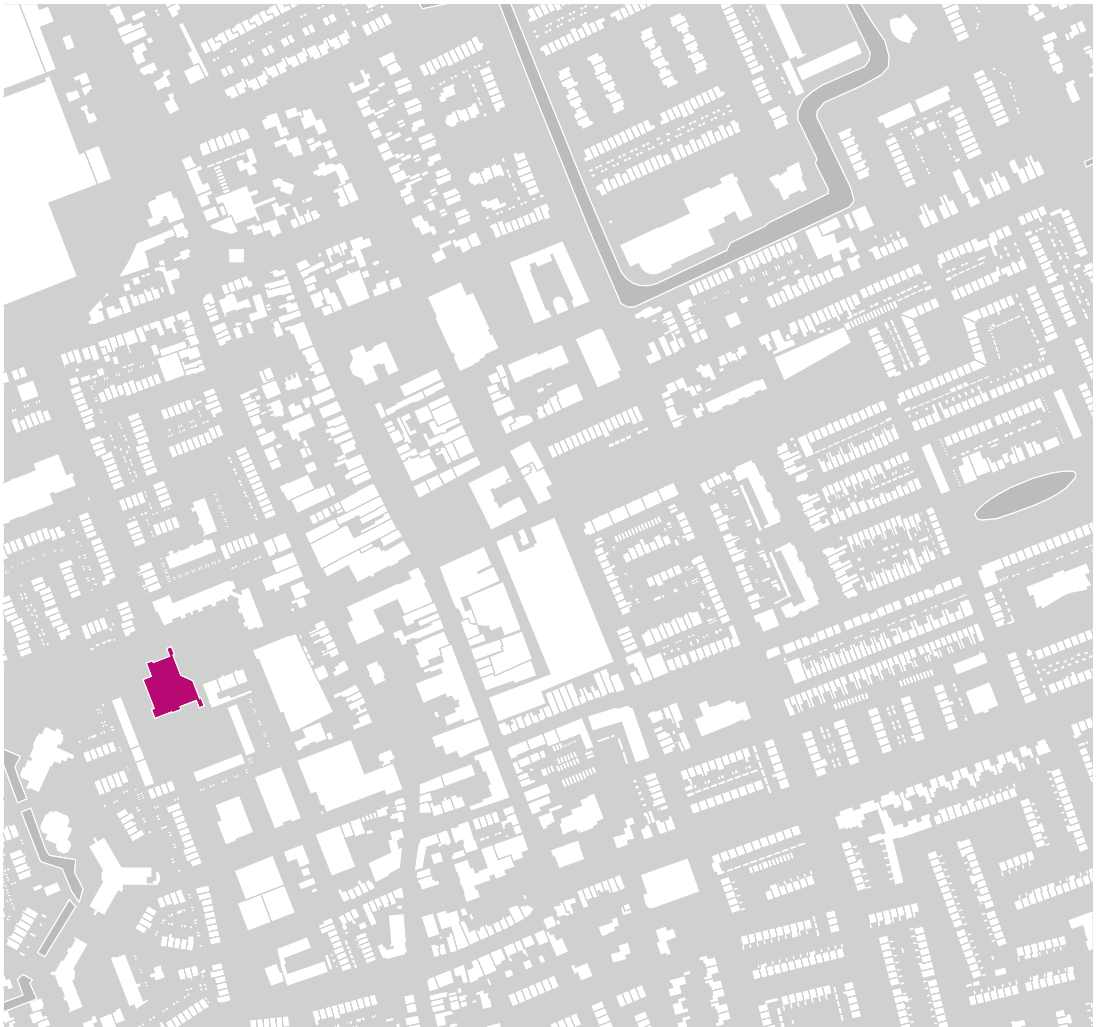
facilities

cooking and food		graphic design	
creative writing		game design	
virtual reality		robotics	●
jewelery		3d drawing	
textiles		3d scanning	●
music		3d printing	●
art		coding dojo	●
audio		vinyl cutting	
video		2d laser cutting	●
materials	●	Lego	
		handicrafts	●


de Bibliotheek





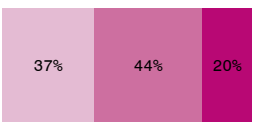


's-Gravenzande

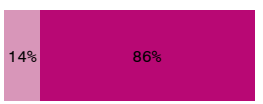
The transparent walls (window frames with windows) were already present in a corner as a former art loan of the library. This lockable space is easy to find.

population CBS, 2018	107.492
area CBS, 2018	90,74 km²
population per km² CBS, 2017	1.300
annual household income CBS, 2014	€ 31.200

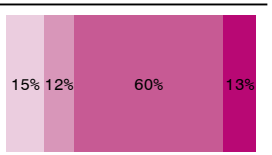
education level
CBS, 2011
- low educated
- middle educated
- highly educated

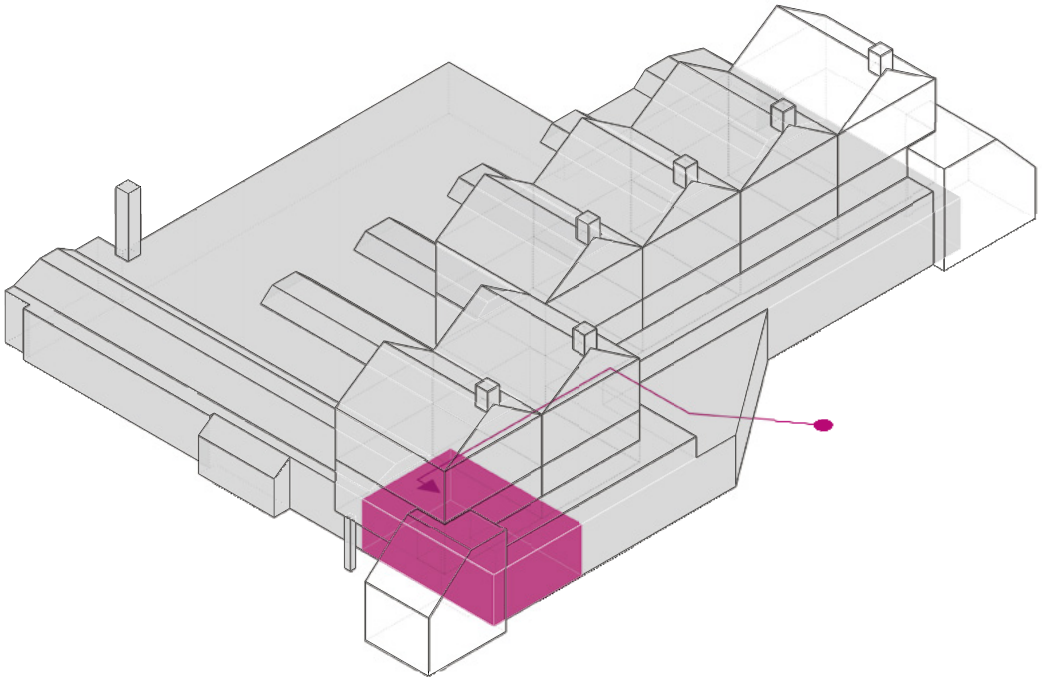


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- agriculture, forestry and fishing
- industry and energy
- commercial service
- non-commercial service



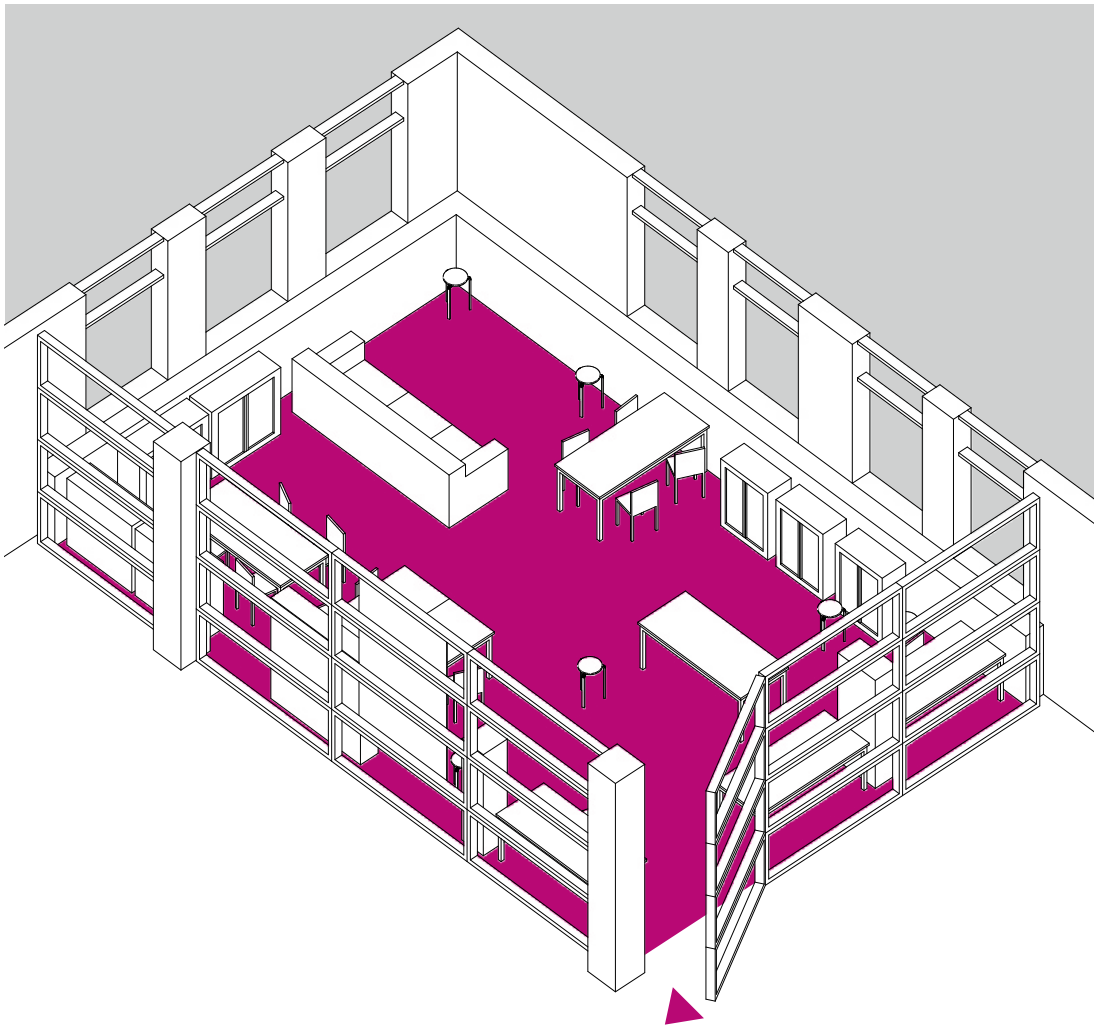


Bibliotheek Gravenzande

The room adjoins a reading café that many elderly people use. These often experience the noise produced by the children as a nuisance. An adjacent back space, beyond the reading room, is often involved in activities that do not require direct fixed equipment.

scale	S
space	enclosed
arts and crafts	
twenty-first century skills	●
floor area	

○ building	3.113	m^2
● library	1.447	m^2
● makerspace	75	m^2



BiebLab

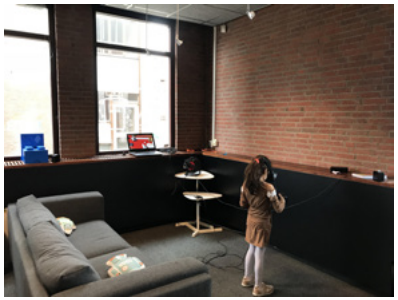
This maker place focuses on digital skills with a large part 3D printing. There is a VR corner available, and a couch to give a living room feeling. The makerspace is primary school focused.

workplaces	15	
floor area		
● makerspace	75	m^2
○ floor area per person	5,0	m^2

facilities

cooking and food	●	graphic design	
creative writing	●	game design	
virtual reality	●	robotics	●
jewelery	●	3d drawing	●
textiles	●	3d scanning	
music	●	3d printing	●
art	●	coding dojo	●
audio		vinyl cutting	●
video		2d laser cutting	
materials		Lego	●
		handicrafts	

building | library | makerspace

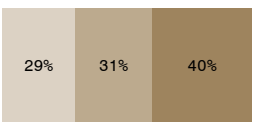


Amsterdam

Amsterdam is undergoing major developments. A substantial investment has been made by the City of Amsterdam to create makerspaces at most of its library locations.

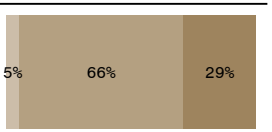
population CBS, 2018	854.047
area CBS, 2018	219,49 km²
population per km² CBS, 2017	5.111
annual household income CBS, 2014	€ 35.800

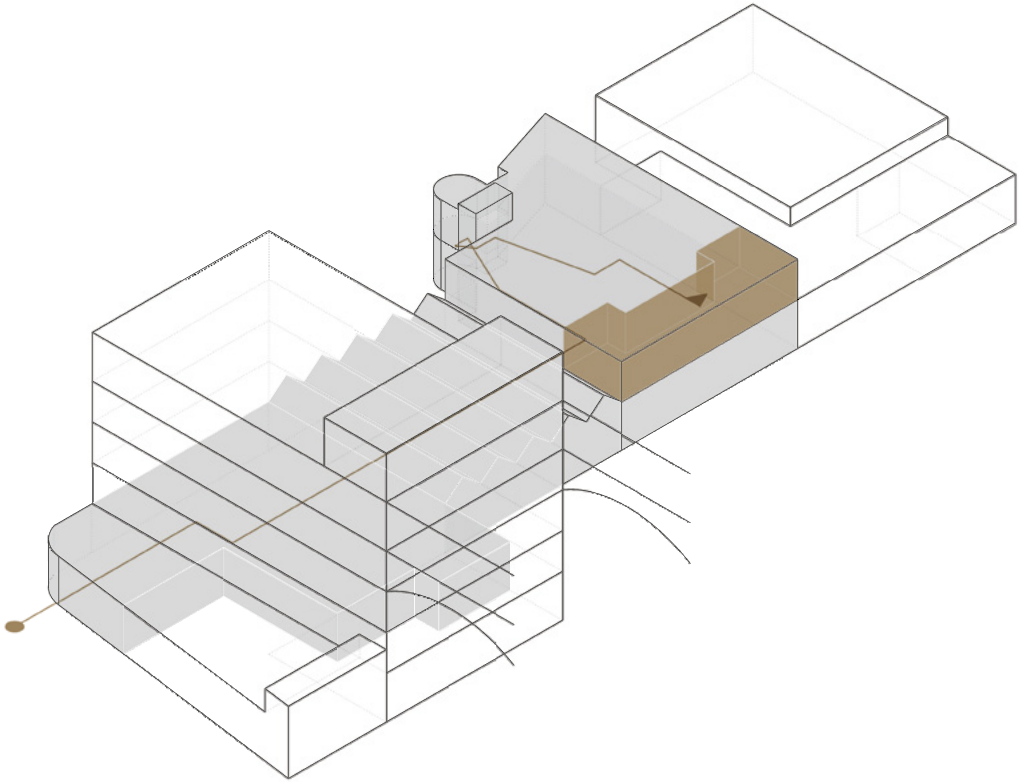
education level
CBS, 2011
- low educated
- middle educated
- highly educated



background
CBS, 2017
- migration background
- Dutch background

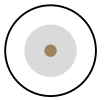
labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service



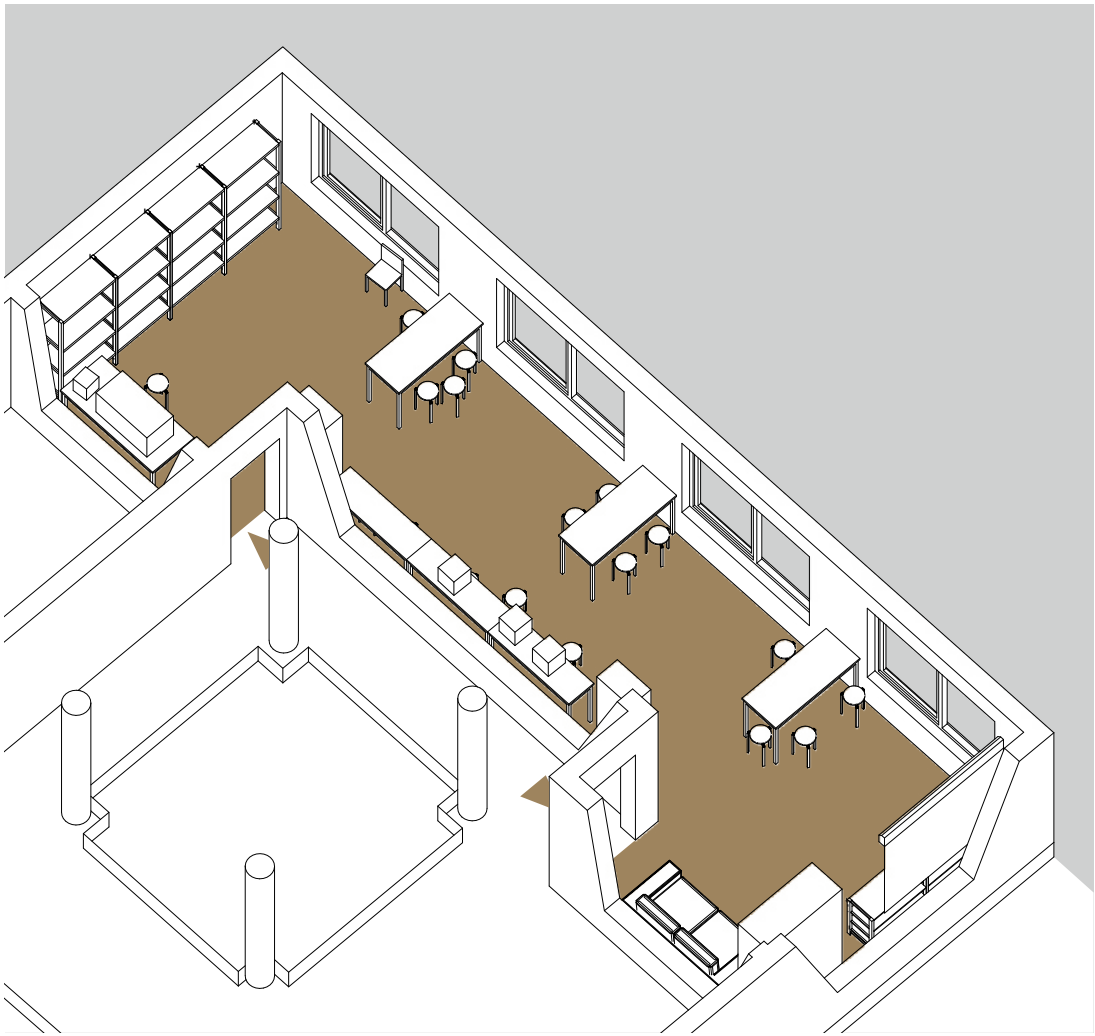


OBA Reigersbos

The Reigersbos location is part of a bigger office building attached to the Amsterdam metro system. The library has its own entrance. The makerspace is located far in the back, on the first floor close to an atrium.

scale	L
space	enclosed
arts and crafts	●
twenty-first century skills	●
floor area	

○ building	3.162	m^2
● library	1.052	m^2
● makerspace	59	m^2



Maakplaats 021

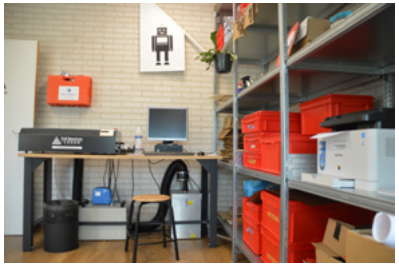
This makerspace is rather small but well equipped. All Amsterdam makerspaces have a standard set of equipment and enough storage space in open cabinets.

workplaces	10	
floor area		
● makerspace	59	m^2
○ floor area per person	5,9	m^2

facilities

cooking and food		graphic design	
creative writing	●	game design	
virtual reality		robotics	
jewelery		3d drawing	●
textiles		3d scanning	
music		3d printing	●
art	●	coding dojo	●
audio		vinyl cutting	
video		2d laser cutting	●
materials	●	Lego	
		handicrafts	●

building | library | makerspace

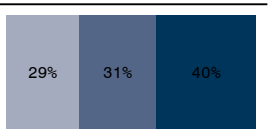


Amsterdam

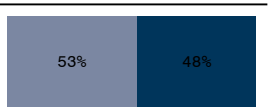
The Slotermeer location is part of a social multi-functional building. The library has two entrances, one main entrance and one through the adjacent cafe. The Amsterdam makerspaces have their own branding.

population CBS, 2018	854.047
area CBS, 2018	219,49 km²
population per km² CBS, 2017	5.111
annual household income CBS, 2014	€ 35.800

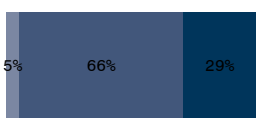
education level
CBS, 2011
- low educated
- middle educated
- highly educated

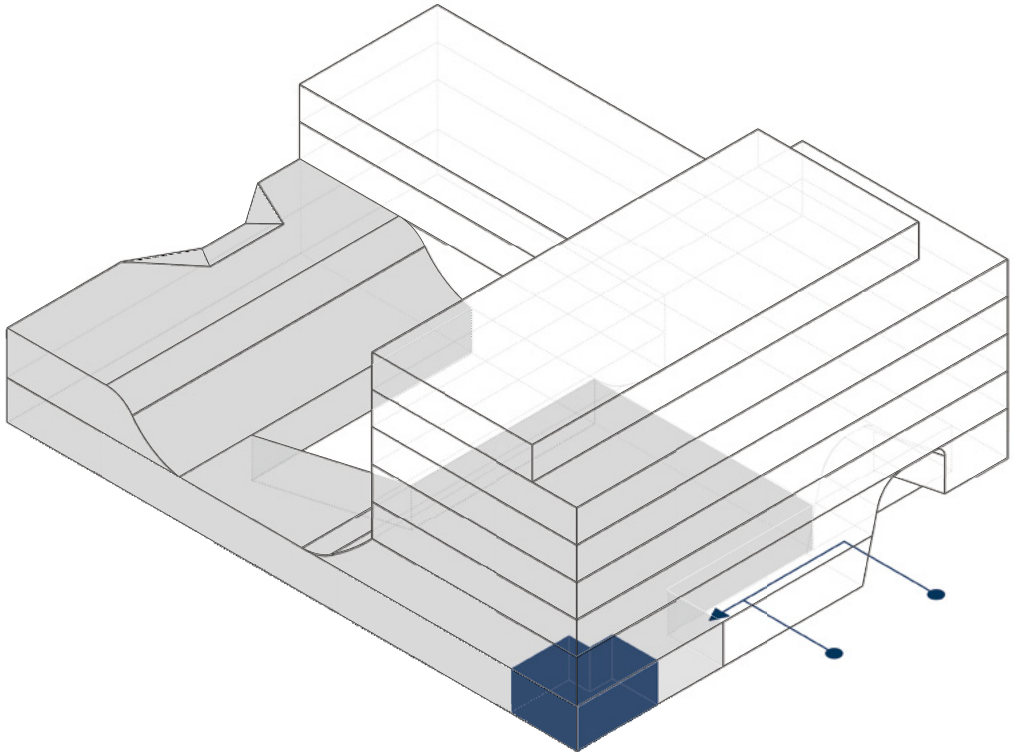


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- industry and energy
- commercial service
- non-commercial service

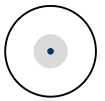




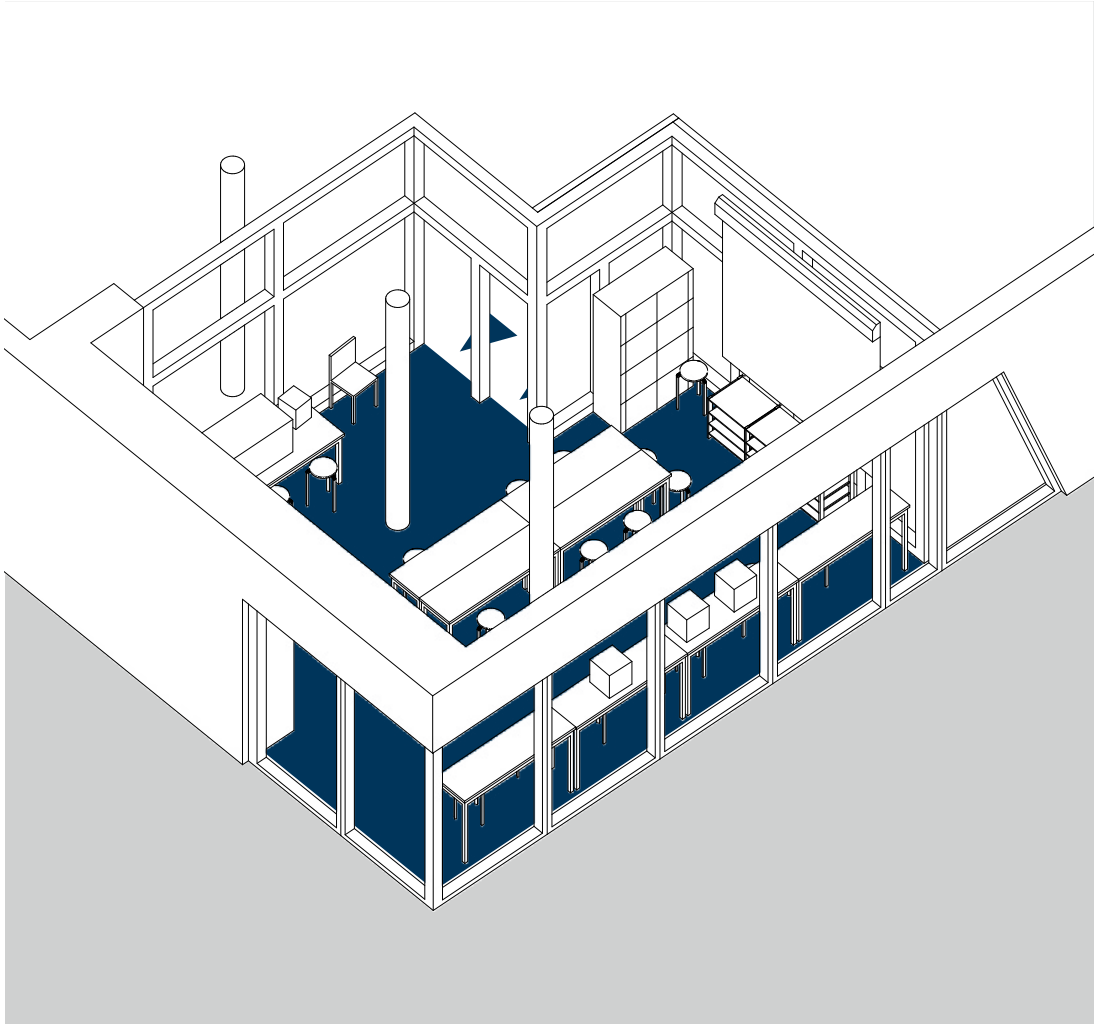
OBA Slotermeer

The library spans out all to the back on the ground floor. Some offices are in the back on the first floor. The corner visible from the street was initially designed for the reading cafe.

scale	L
space	enclosed
arts and crafts	●
twenty-first century skills	●
floor area	



○ building	8.009 m²
● library	1.135 m²
● makerspace	42 m²



Maakplaats 021

This reading cafe was transformed into the makerspace. The visible connection to the urban surrounding is very important in attracting new visitors. The products made are shown in the window.

workplaces	15

floor area

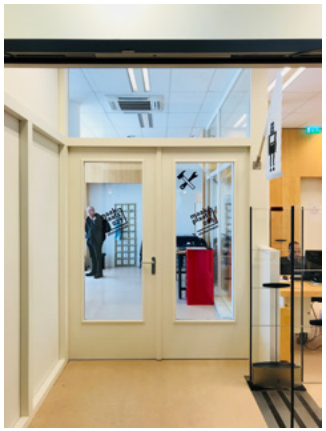
● makerspace	42	m^2
○ floor area per person	2,8	m^2

facilities

cooking and food		graphic design	●
creative writing		game design	
virtual reality		robotics	●
jewelery	●	3d drawing	
textiles	●	3d scanning	
music		3d printing	●
art		coding dojo	●
audio		vinyl cutting	
video	●	2d laser cutting	●
materials	●	Lego	
		handicrafts	●

building

library



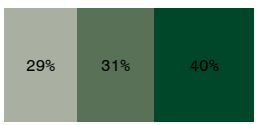
makerspace

Amsterdam

This large hybrid building contains housing, shops and social functions also hosts the library at the ground floor. An additional shop space is hired for the makerspace.

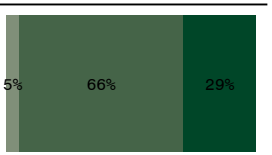
population CBS, 2018	854.047
area CBS, 2018	219,49 km²
population per km² CBS, 2017	5.111
annual household income CBS, 2014	€ 35.800

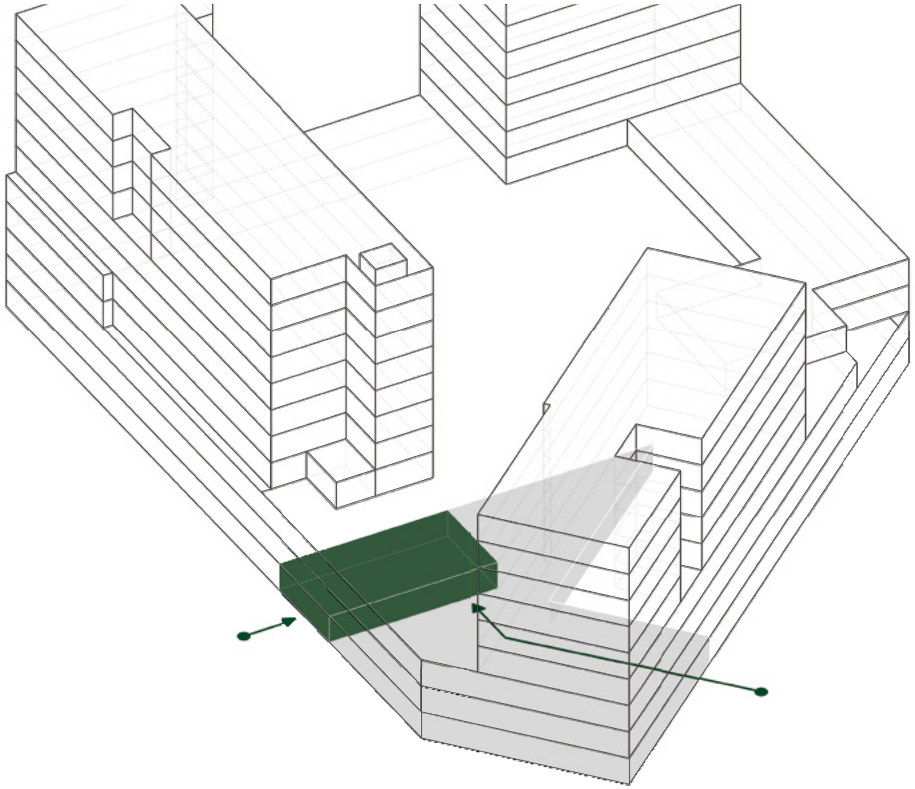
education level
CBS, 2011
- low educated
- middle educated
- highly educated



background
CBS, 2017
- migration background
- Dutch background

labor sectors
CBS, 2016
- agriculture, forestry and fishing
- industry and energy
- commercial service
- non-commercial service

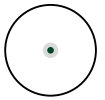




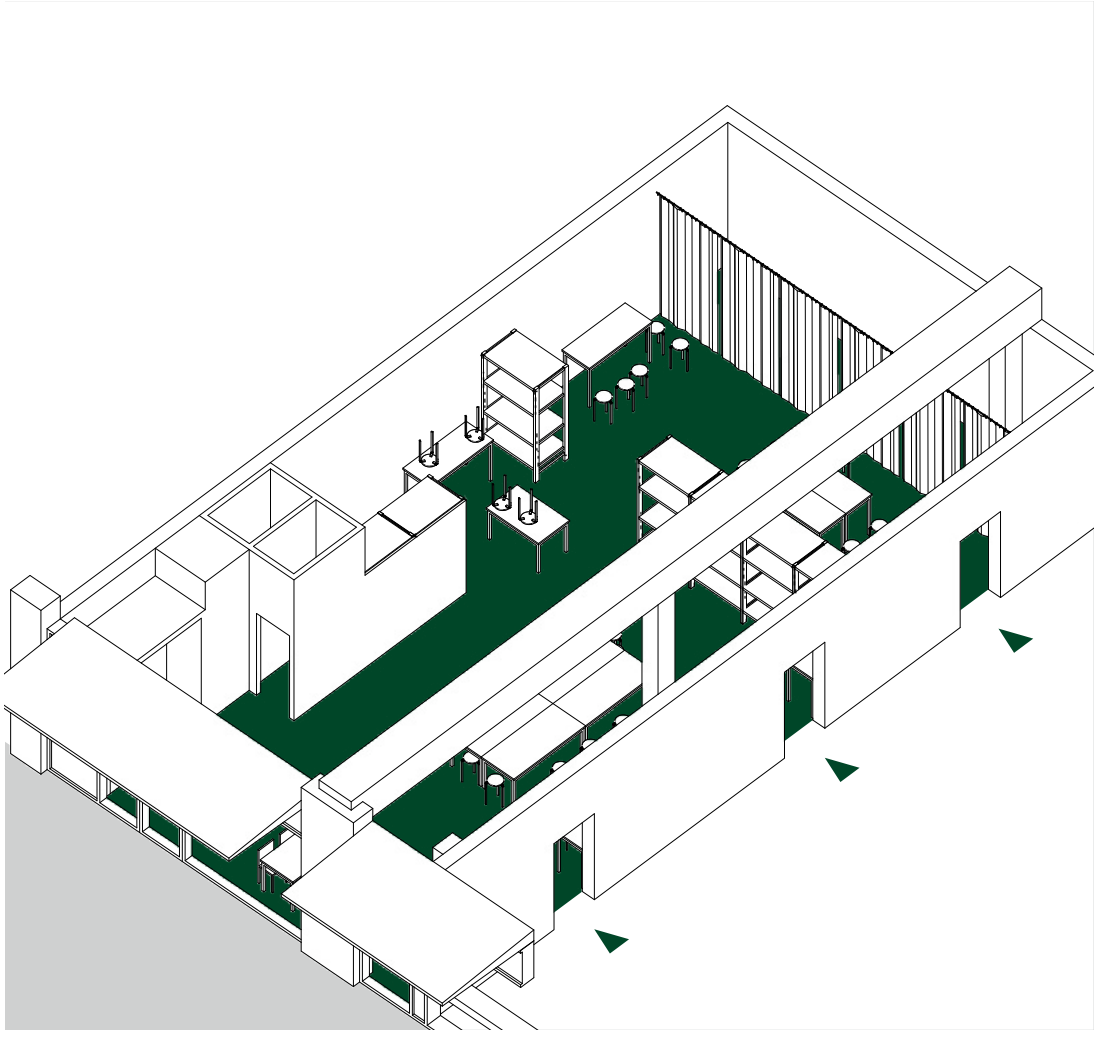
OBA Waterlandplein

The library and the makerpace are connected by three doors. The makerspace has its own entrance from the street and is therefore unique in this atlas of makerspaces.

scale	L
space	enclosed
arts and crafts	●
twenty-first century skills	●
floor area	



○ building	32.950 m^2
● library	950 m^2
● makerspace	174 m^2



Maakplaats 021

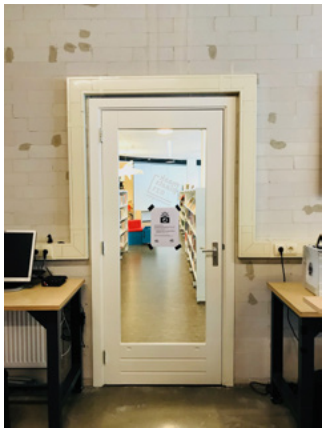
This makerspace is one of the few spaces that offers working with textiles, along with other 'digital' possibilities.

workplaces	30
floor area	
● makerspace	174 m²
○ floor area per person	5,8 m²

facilities

cooking and food		graphic design	●
creative writing		game design	
virtual reality		robotics	●
jewelery	●	3d drawing	
textiles	●	3d scanning	●
music		3d printing	●
art		coding dojo	●
audio		vinyl cutting	
video	●	2d laser cutting	●
materials	●	Lego	
		handicrafts	●

building | library | makerspace

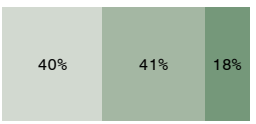


Tiel

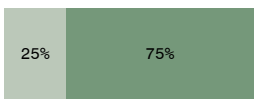
The brand new cultural building *Zindert,* houses cultural institutes, a theatre and the Tiel public library with the makerspace *Medialab.* The Medialab focuses mainly on digital skills.

population CBS, 2018	41.465
area CBS, 2018	35,51 km²
population per km² CBS, 2017	1.262
annual household income CBS, 2014	€ 30.700

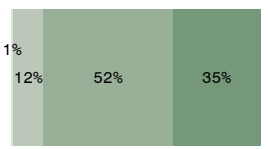
education level
CBS, 2011
- low educated
- middle educated
- highly educated

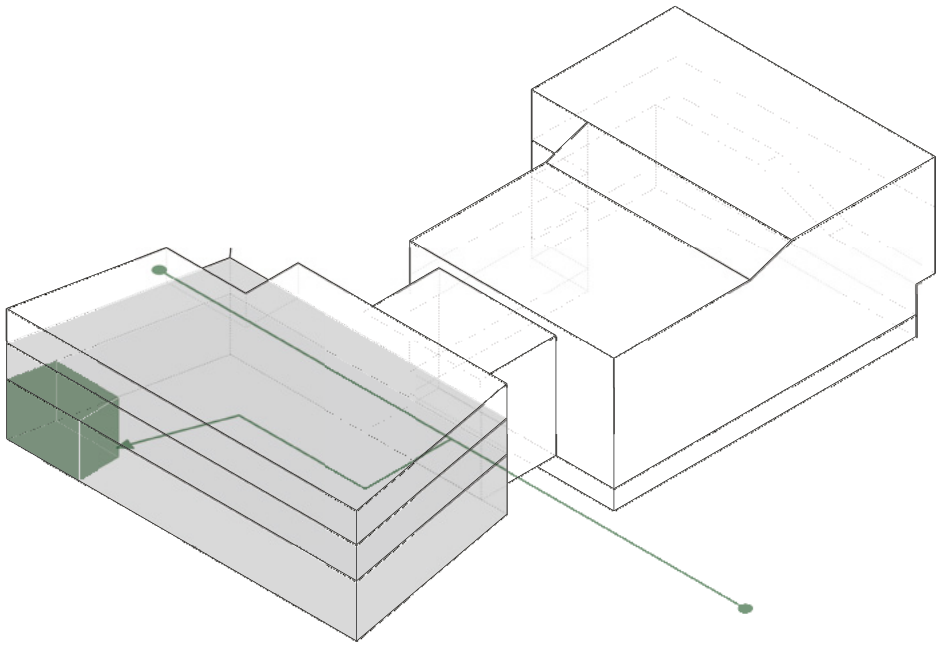


background
CBS, 2017
- migration background
- Dutch background



labor sectors
CBS, 2016
- agriculture, forestry and fishing
- industry and energy
- commercial service
- non-commercial service

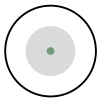




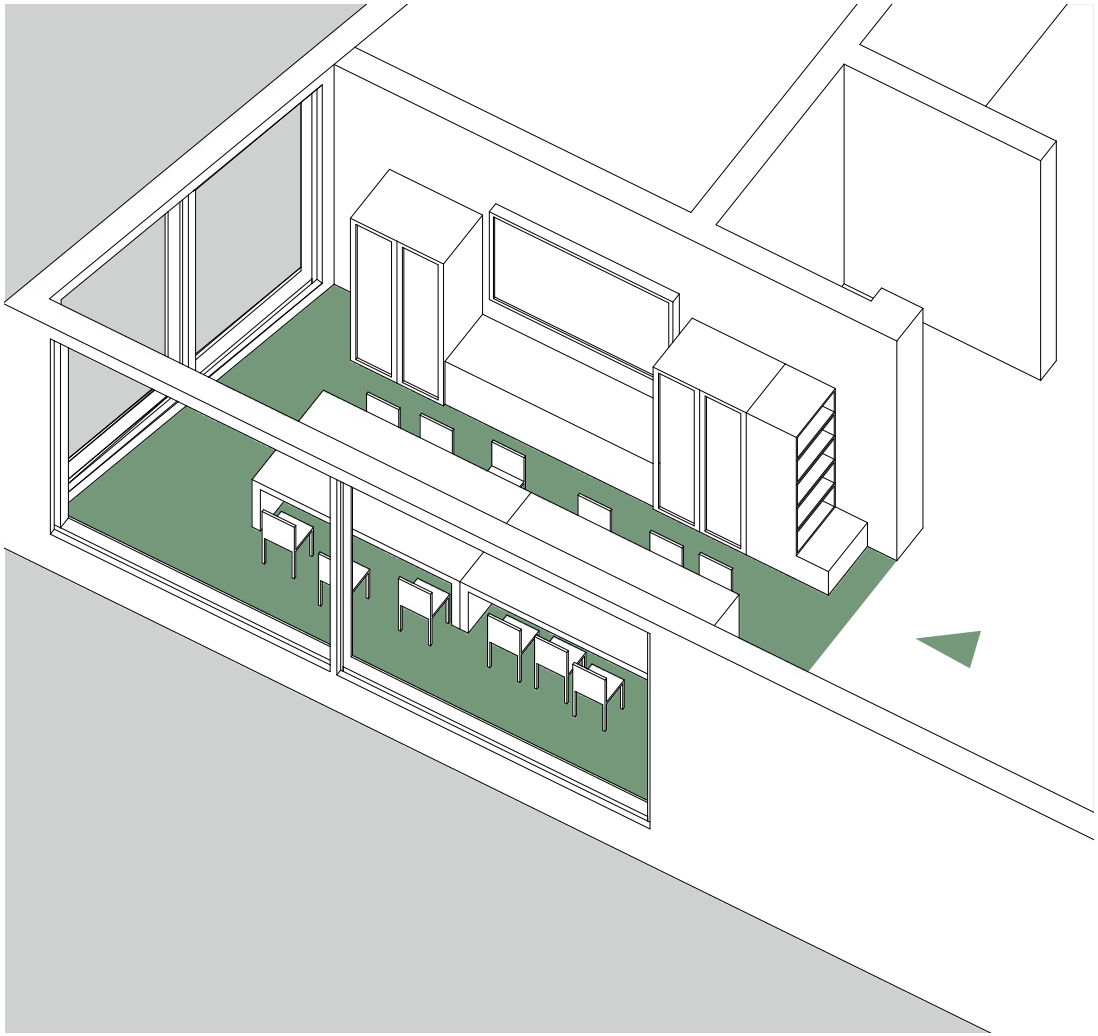
Bibliotheek Tiel

The Medialab is well located within the library on the ground floor and is also clearly visible from the outside. If there are many children present, the noice is very high. Therefore, the youth section is on the ground floor and most adult books are on the first floor.

scale	S
space	open plan
arts and crafts	
twenty-first century skills	●
floor area	



○ building	5.087	m^2
● library	1.534	m^2
● makerspace	37	m^2



Medialab Tiel

The space is open, not very large and not suitable for other activities than those mentioned above. The Medialab is very popular and attracts many curious and visitors due to its visibility from the street. When the Medialab is closed, everything is stored in the cabinets (see-through with bars, so that those interested can see what has been made).

workplaces	12

floor area

● makerspace	37	m^2
○ floor area per person	3,1	m^2

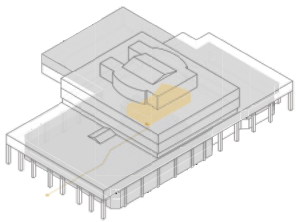
facilities

cooking and food		graphic design	
creative writing	●	game design	
virtual reality		robotics	●
jewelery		3d drawing	●
textiles	●	3d scanning	
music		3d printing	●
art	●	coding dojo	●
audio		vinyl cutting	
video		2d laser cutting	
materials	●	Lego	●
		handicrafts	

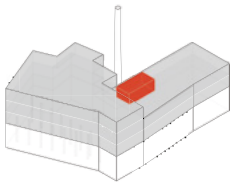
building | library | makerspace

Building configurations

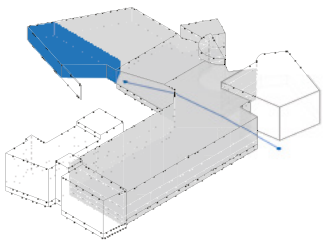
Tilburg



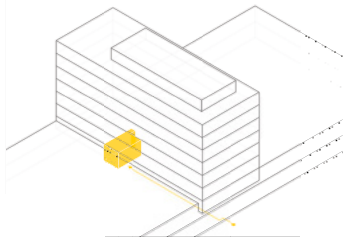
Veenendaal



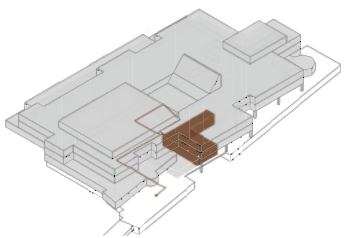
Breda



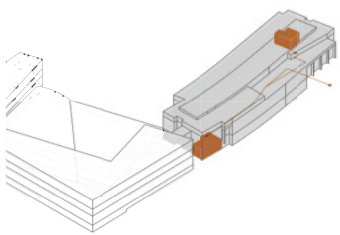
Eindhoven



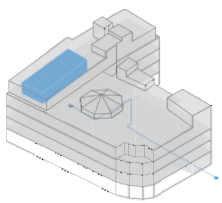
Middelburg



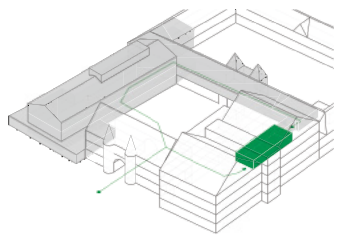
Apeldoorn



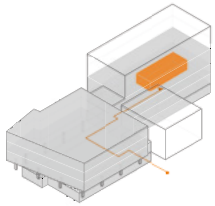
Utrecht



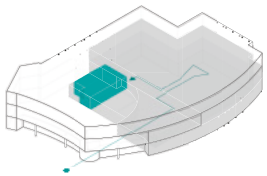
Leeuwarden



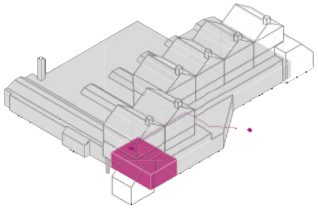
Zwolle



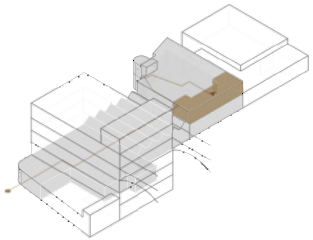
Steenwijk



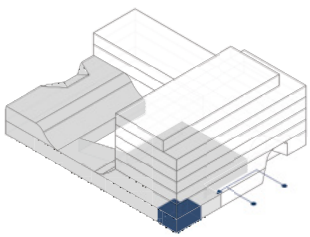
’s-Gravenzande



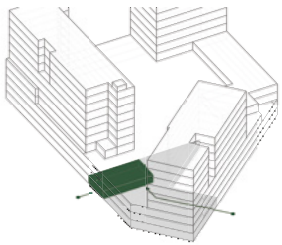
Amsterdam Reigersbos



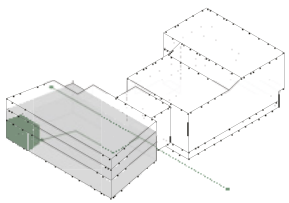
Amsterdam Slotermeer



Amsterdam Waterlandplein



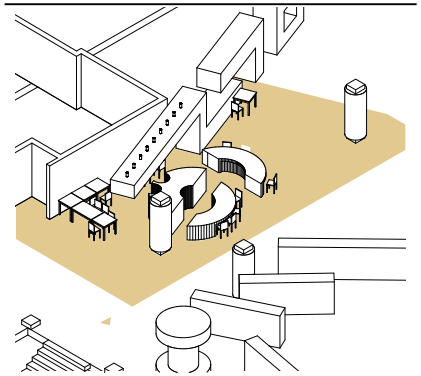
Tiel



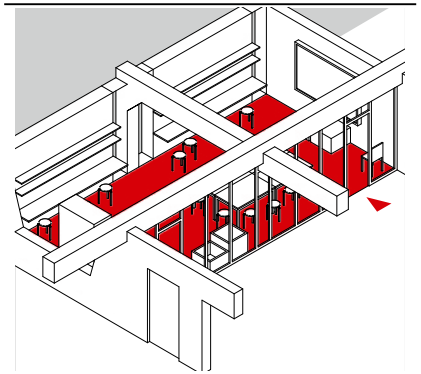
Surfaces Comparison

Makerspaces configurations

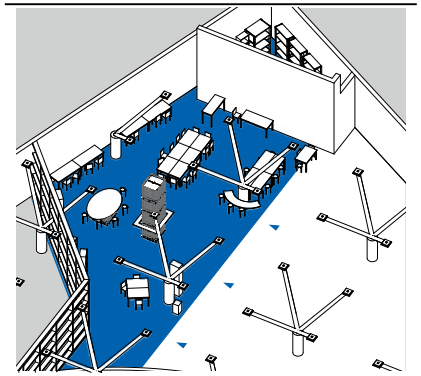
Tilburg



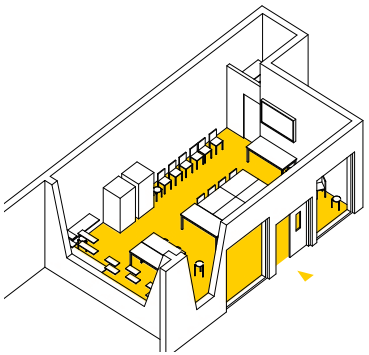
Veenendaal



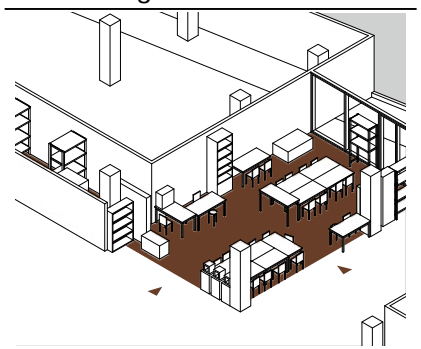
Breda



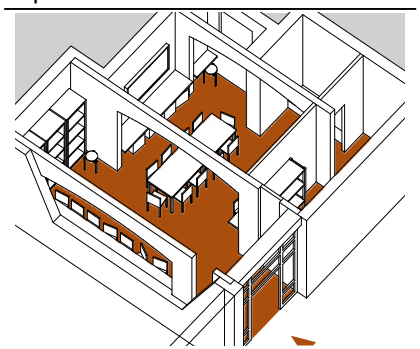
Eindhoven



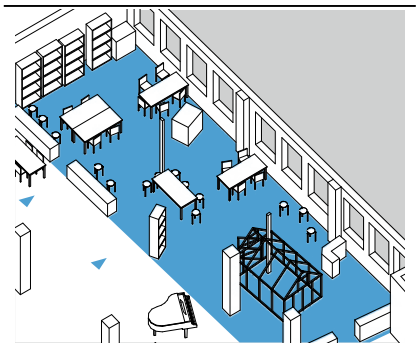
Middelburg



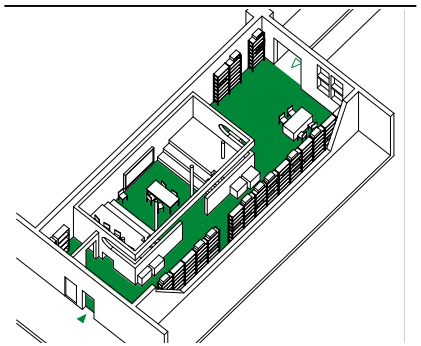
Apeldoorn



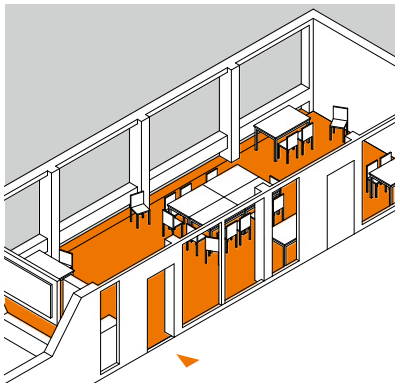
Utrecht



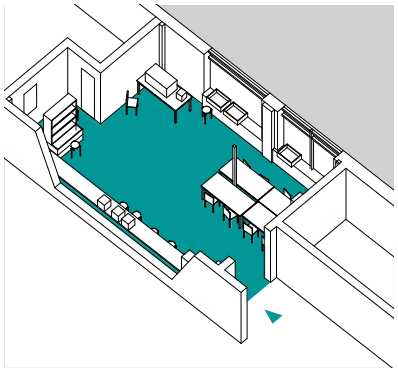
Leeuwarden



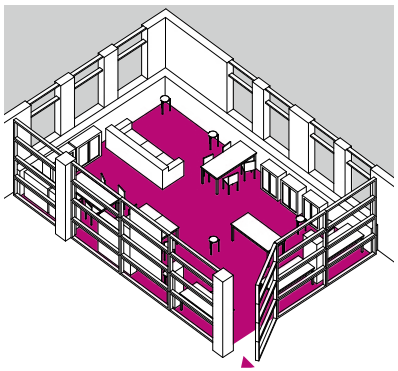
Zwolle



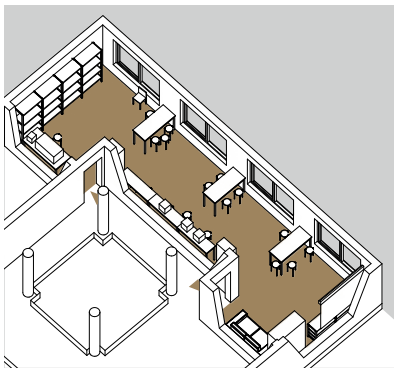
Steenwijk



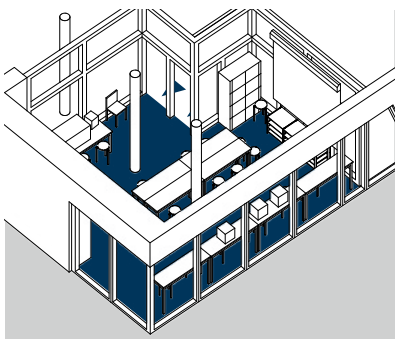
’s-Gravenzande



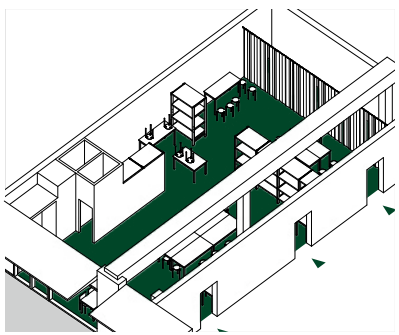
Amsterdam Reigersbos



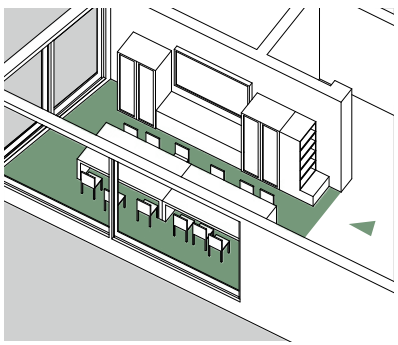
Amsterdam Slotermeer



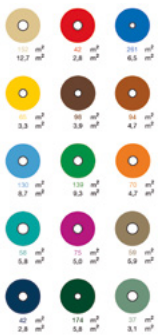
Amsterdam Waterlandplein



Tiel



Surfaces Per Person



Spatial Characters of Fifteen Public Library Makerspaces in the Netherlands

dr. Olindo Caso

Remarkably little information exists on the spatial issues associated to makerspaces in public libraries. An exception is given by the recent study of Theresa Willingham (2018) that reports about spatial issues when initiating a makerspace in a library. Among the spatial aspects of makerspaces design, after allocation of space and the floor plan Willingham mentions: accessibility and usability; lighting; power distribution; storage; safety and security; adaptability. Willingham's study is an useful guide for initiating a makerspace. It includes practical suggestions and good practices, and for this it is a recommended reading.

Nevertheless, a comprehensive study is still missing of such spatial and design aspects – even more when these aspects involve architectural design, thus not just limited by the pragmatism of the makerspace functioning. This missing information does not escape the Dutch context, notwithstanding the detected impetuous growth of makerspaces in public libraries (KB 2018). The information could be obtained empirically, from the choices made by designers of the many library buildings that have been recently realized and that include a makerspace. Alternatively, this information can be obtained from the experiences done by many libraries in their quest of initiating a makerspace in their own branches. This last is the direction chosen in this inquiry, through the empirical observation of a number of settled library's makerspaces in operation.

Accordingly, this chapter addresses the spatial characters of the fifteen makerspaces in Dutch libraries that have been the object of the field investigation in this project and that are mapped in the previous chapter, the Atlas. In doing this, the spatial and design aspects taken into consideration are:

- The relationships with the external urban space: visibility and presence;
- The accessibility and reachability of the makerspace inside the hosting library: clarity of the routing, obstacles;
- The position of the makerspace in the hosting library: which floor, is it central or peripheral located;
- The relationships with the makerspace's surrounding services and programs;
- The configuration of the space: its form and setting (closed or open);
- The actual size of the makerspace: is it L, M, or S?;[1]
- The flexibility and adaptability of the makerspace, the degree at which the makerspace can adopt different configurations in time;
- The possible availability of ancillary spaces, e.g. for storage, meetings, workshops;
- The spatial interventions and modifications due to the makerspace's technical equipment, like additional air-filters, chimneys, sound barriers and similar artefacts;
- The design specificity of the makerspace: generic space vs. specific space; the envisaged target group.

1 Large, Medium, or Small according to the distinction made when selecting the case studies, resp.: > 70m^2; 30 m^2 < 70 m^2; < 30 m^2, see scheme at p. 37. The selection has been made on the basis of the information supplied by the libraries at a survey (KB 2018). The empirical observations by inquirers not always matched that supplied information.

Rather than being exhaustive, this list addresses the different scales at which the spatial aspects can be observed: urban, building, interior, detail, installation and equipment. The goal is to enlighten the similarities and differences among the experiences, what are the generic choices made (by the most libraries) and what are the specific choices (made by one or by few libraries). The observations provide the materials for a critical discussion informed by the inquirers' expertise and disciplinary backgrounds.[2] These critical considerations and the expectations for the future inspired a brainstorm on the spatial conceptualization of the future of the makerspace in library setting. Accordingly, the following paragraphs are informed by a raising speculative content and respectively address:

1: The generic and specific spatial choices made by public libraries in initiating the makerspace: comparison of empirical findings;

2: Critical considerations about these generic and specific choices and about the observed patterns: informed discussion;

3: Possible scenario's and work hypothesis for the (future) design of the makerspace in library setting: a speculative brainstorm.

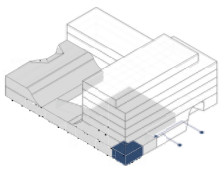
2 Among the others: Architecture; Architectural and Urban Design; Spatial Relationships; Typology and Composition.

1. Generic choices and specific choices

This paragraph compares the spatial aspects in the observed fifteen libraries in order to enlighten similarities and differences, generic and specific approaches / spatial solutions.

Library hierarchy and branches

OBA branch Slotermeer.

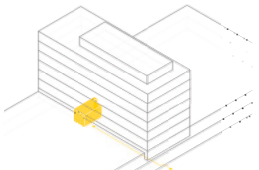


In the last years the library system in the Netherlands has known a merging dynamic by which public libraries in adjacent areas have been combined into networks. The larger library in the network (usually the one related to the most populated area) assumed the administrative task of main node in the local public library network.

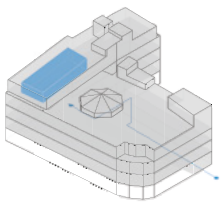
All visited makerspaces are located in library buildings (both autonomous library buildings or buildings that host a library among other functions) that are main nodes in their own library network/territory, excepting the three visited libraries in Amsterdam that are neighbourhood branches of the Amsterdam Public Library (OBA *Openbare Bibliotheek Amsterdam*). Eindhoven's makerspace is also an exception as it is an autonomous space (yet part of the Eindhoven library system), physically detached from a library building and somehow a branch in itself.

In the larger Dutch cities library policies for inclusion address the (potentially) 'lagging behind' social groups by reaching out to the neighbourhoods through (dedicated) library branches of the main library headquarters. These local branches are therefore very important for library engagement towards all citizens, in particular the less favoured groups. For this, OBA said to take advantage of the local library network to implement makerspaces in these branches first, before eventually initiating one in the main central library building.

Eindhoven library makerspace is located at the Microlab.



Utrecht library will move soon to a new accommodation.



The LocHal in the Tilburg Spoorzone is the new place of Tilburg public library. *Image, Mecanoo.*

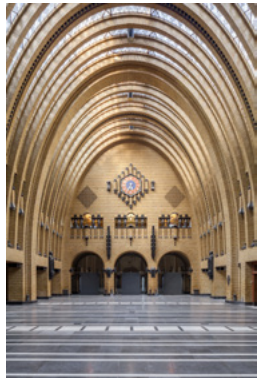
Permanent or temporary

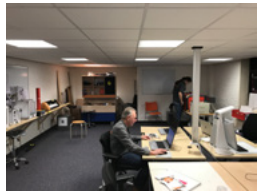
All visited makerspaces are intended to be permanent, excepting Eindhoven's which is temporary. This experiment will be evaluated according to its specific ambition of making connections with the creative business (it is hosted by the Microlab, a creative industry hub) and according to the role it can play in the further urbanization of the former industrial area in which it is positioned (the Philips/Strijp areas) as initiator of the local neighbourhood branch.

'Permanent' here refers to the offer of the service, not to the position of the makerspace in the library or to its spatial configuration, which can change in time. Two libraries will move to a new accommodation soon as construction is advancing: Utrecht will move to the monumental former post-office building at Neude – here the makerspace will be located at the side of the main entrance according to floorplans, obtaining visibility from and to the urban space; while Tilburg library will move to the LocHal, a former service building in the railway redevelopment zone, in the proximity of the main train station. In the actual concept the new Tilburg library at the LocHal will address a great deal of 'making' possibilities. Mecanoo Architects is one of the designers engaged in this Tilburg library project.

Other libraries too are considering relocating their makerspace within the own perimeter, yet no plans were officially released at time of site-visit. In the case of Steenwijk, however, the makerspace is going to be moved next to the main entrance at the ground floor leaving the present location in the windowless basement. The (mostly) volunteers staff welcomes very much this change.

The former post office at Neude will host the new public library of Utrecht. *Image, ZECC Architects.*





Makerspace in Steenwijk library is located at the basement floor. *Kuijper.*

Type of makerspace

Leeuwarden public library hosts a Lego makerspace. *Kuijper.*

Makerspaces in the Netherlands have been inspired by different models.[3]

Four makerspaces among the visited are FabLabs (at Apeldoorn, Breda, Middelburg and Veenendaal) offering opportunities based on the FabLab 'open source' philosophy and connected to the FabLab network; one (in Leeuwarden) only offer special educational Lego programs; while the remaining ten are generic makerspaces. These ones mainly offer digital or digital-based making (coding, programming, 3d printing etc.) as the crafting opportunities are limited.

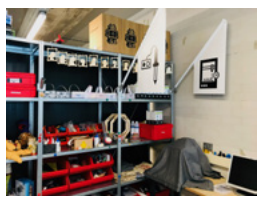
Eindhoven seems to offer more tinkering possibilities than the average of the visited ones (variety of tools available), and Amsterdam Waterlandplein says to integrate these two modalities of making. Tiel's makerspace is especially devoted to digital making opportunities (coding, robotics).

Breda's library also hosts music and art schools: here the FabLab is one of the (cultural) opportunities offered by the library, but no evident connection between FabLab and art schools have been observed by inquirers.

Tiel makerspace is devoted to digital making. *Kuijper.*

In terms of space, no much differences have been detected between the different models. Lego and coding-only programs do not need special equipment for crafts like soldering or for digital-supported making like laser cutters and 3d printers (plus the necessary additional installations), equipment that is in general present in the other visited makerspaces. In general, the visited makerspaces promoted a digital / innovation-directed type of making, while the traditional crafting possibilities have been discussed less.

Tools for wood-working at makerspace Eindhoven. *Caso.*



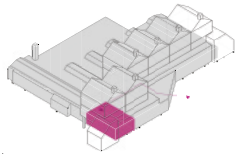
OBA branch Waterlandplein offers different making opportunities. *Kuijper.*

3 Read footnote 7 at p. 16 for a definition of different types of makerspaces.

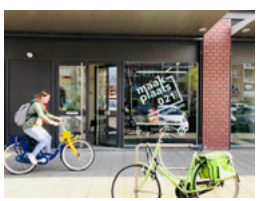
Relationship with urban space

The most makerspaces in libraries are not visible from the urban public space. Among the visited only ’s-Gravenzande, Tiel, Amsterdam Slotermeer and Amsterdam Waterlandplein have an obvious visible connection with the external public space. Zwolle and Middelburg are also visible, but this experience is not very significant in urban sense (Zwolle’s maker-space faces a parking lot and Middelburg faces a large waterway).

Library makerspace at ‘s-Gravenzande is visible from the street.



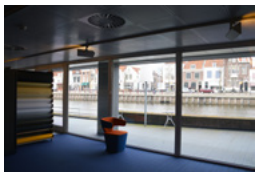
Amsterdam Waterlandplein is the only makerspace among visited with an own direct entrance from the urban space. Amsterdam Slotermeer is almost in the same situation but indirectly, as visitors do not have to go through the library (or through the adjacent coffee bar) to access the makerspace. This makerspace is located at the border between the different social institutes hosted by the multifunctional building ‘De Honingraat’, which has several entrances. This space was initially thought-of as a hinge between the library and the coffee bar; now it hosts the makerspace. Also the Leeuwarden library’s makerspace has a second own entrance, although not very visible.



OBA Waterlandplein makerspace has an own entrance. *Kuijper.*

View towards the street from the makerspace at OBA branch Slotermeer. *Caso.*

Terrace facing waterside at Middelburg, exterior and interior. *Caso.*



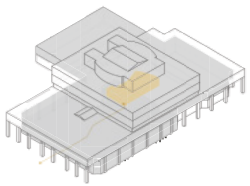
None among the visited libraries has an own outdoor open space which could serve as a connector between the city and the library, surely not the makerspaces. The only outdoor space belonging to a library that a makerspace could use have been found in Middelburg. Though, this space lays at a not publicly accessible waterfront, and is likely to stay hardly accessible for the library visitors, probably for safety reasons. It is indeed a terrace that was probably intended as a pleasant extension for the Auditorium's foyer. At Breda the makerspace lays adjacent a nice, green courtyard that can provide interesting spatial opportunities.

Zwolle makerspace overlooks a parking lot. *Caso.*

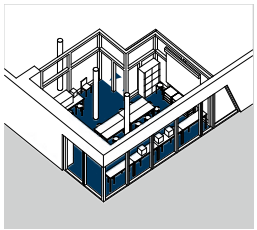
Position in library

All makerspaces have been given a peripheral location in the library, excepting Tilburg which is located right amidst the library in an open setting, on the first floor, there were previously an information desk was positioned. However, this condition of being peripheral is nuanced and acquires different meanings according to the specific situation of the library. In fact, although positioned in a 'corner' of the library the makerspaces of Breda, Veenendaal, Utrecht, Apeldoorn, 's-Gravenzande, Amsterdam Slotermeer and Tiel hold

Tilburg digilab.



Makerspace of OBA branch Slotermeer has transarent walls towards both the library and the street.



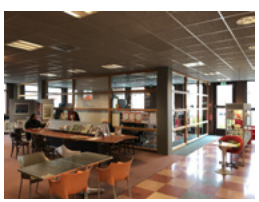
direct (visual) relationships with significant parts of their hosting libraries, mostly due to an open setting or a transparent materialization. The other makerspaces are felt more peripheral in the own library due to harder separations (like the materialization and/or a location away from core areas of library). The choice of at which floor to locate the makerspace also plays a role at this regard.

The position also influences the degree of spatial integration in the library as experienced by the inquirers on the basis of position, internal physical and programmatic relationships, visibility and routing.

Program proximity

The position of the makerspace in relation to other services in the visited libraries is typically adjacent:

- The (book) collections (Tilburg, Amsterdam Waterlandplein, Veenendaal, Utrecht, Breda, Tiel);
- The study areas (Apeldoorn, Tilburg);
- The meeting rooms/auditorium (Zwolle, Amsterdam Reigersbos, Middelburg, Apeldoorn);
- The library's offices (Amsterdam Reigersbos);
- The PC work-stations and study areas (Tilburg, Tiel, Apeldoorn, Amsterdam Slotermeer);
- The art-lending section ('s-Gravenzande);
- The dedicated children area (Apeldoorn, 's-Gravenzande);
- The reading table ('s-Gravenzande).



's-Gravenzande Bieblab is adjacent the reading table and the art lending. *Kuijper.*

A fully transparent waal separates the makerspace from the library at Veenendaal. *Kuijper.*

Furthermore:

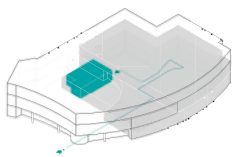
- No makerspace is connected with a library's café or a coffee corner but at Amsterdam Slotermeer, where the café is close-by;
- Leeuwarden makerspace has its own dedicate space, still the collections extend to the makerspace. This was decided later, yet the organizing team of the makerspace would rather prefer to have no collection in that room;
- Steenwijk's makerspace is not adjacent to any other library function due to its isolated position in the basement;
- Eindhoven has its own specificity of being detached from the library. It neighbours the offices of creative industry to which the hosting building Microlab is dedicated.

Routing and reachability

Interior OBA branch Reigersbos. *Caso.*

When makerspaces are not visible from public space or from entrance/information desk, they need efficient wayfinding. This is not always easy as routing to makerspace in the library can be complicated. Steenwijk's makerspace for instance is difficult to find because of its location in the basement. Leeuwarden's makerspace is located at the end of a long route through the library. This makerspace can be accessed by two sides, of which one side is not part of the library, but likely not every visitor knows it. To use the second entrance the visitor has to enter another part of the multi-purpose building than the library. In the case of Zwolle, there is just a small signage on the makerspace's door pointing out its location in the hallway with other similar rooms. Amsterdam Reigersbos has tried really hard to point out the makerspace's peripheral location in the library by means of good signage and wayfinding; yet it is located one floor up next to the library's offices.

Position of makerspace in Steenwijk library.



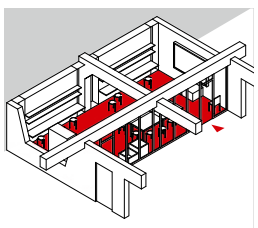
Accessibility

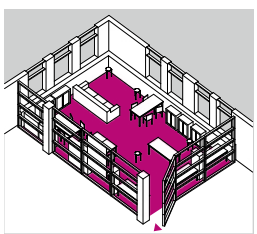
No severe accessibility issues have been detected e.g. regarding disables and elderlies although positioning a makerspace on floors other than the ground-floor is not a favouring condition when it forces some categories of visitors to use a different routing and/or an elevator. This last could in turn affect findability/visibility.

Makerspace setting

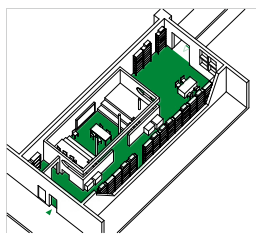
Most of the visited makerspaces are located in a closed setting, meaning physically separated from the overall library spaces by a door. This is the case in Veenendaal, Zwolle, Amsterdam Reigersbos, Amsterdam Waterlandplein, Amsterdam Slotermeer, Apeldoorn, Steenwijk, 's-Gravenzande and Eindhoven (although for this last could not be otherwise being it physically detached from the library building). These makerspaces show a transparent (glass) façade towards the library excepting Reigersbos (in office area), Waterlandplein (hard separation: wall), Apeldoorn (only the entrance is transparent), Steenwijk (in basement). Leeuwarden makerspace is more a hybrid setting between open and closed, because of the collections extending into the dedicated makerspace room. Makerspaces in Tilburg, Middelburg, Breda, Utrecht, Tiel are all configured in open settings.

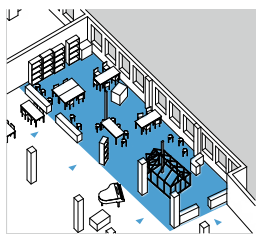
Closed makerspace setting at Veenendaal and 's-Gravenzande (below).





Hybrid makerspace setting at Leeuwarden.



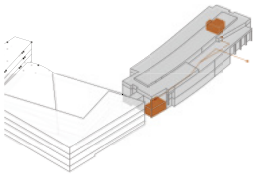


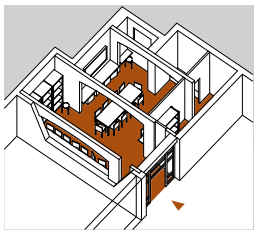
Open makerspace setting at Utrecht.

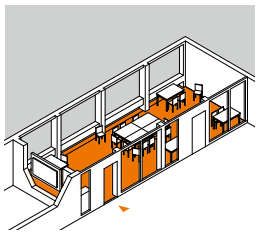
Number of spaces

The makerspaces are generally located in one single room, yet they often enjoy ancillary spaces. A separated storage space serves the makerspaces at Apeldoorn, Amsterdam Waterlandplein (behind curtains), Breda, Eindhoven, Middelburg, and Leeuwarden. All

Position FabLab and VRLab at CODA Apeldoorn.







Regular-shaped makerspaces at libraries Zwolle and Apeldoorn (above).

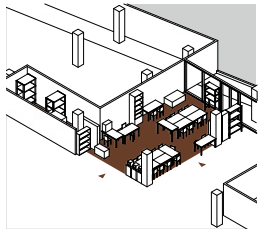
other makerspaces use (lockable) racks and cabinets to store materials and equipment. Middelburg and Breda are open settings equipped with a closed storage. Amsterdam Waterlandplein has also its own toilets and a small pantry, due to the previous retail function of the space it is located in. Also Leeuwarden has a water tap. CODA Apeldoorn holds a second special space dedicated to Virtual Reality (VRLab). These two labs at Apeldoorn are located at the two sides of the basement, separated by the children area and the study area. When extra capacity is needed, the makerspaces can use a close-by meeting room, if available. This is common practice at Tilburg, Veenendaal (but one level below), Apeldoorn, Tiel (but one level above), Middelburg and 's-Gravenzande.

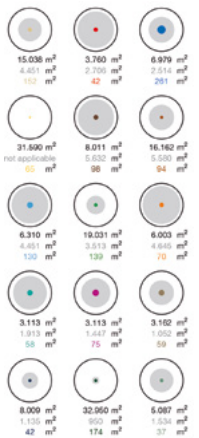
Shape and size

The form of the space is generally regular. This is also the case in open settings as the standard area of the makerspace can be usually good felt/identified. Makerspaces in closed settings have all a rectangular form, being (former) rooms that are refurbished to host the new functionality. More complex room-shapes have not been detected, excepting Apeldoorn which shows some more articulation in bay-areas. The few irregularities in floor plans usually accommodate storages or similar purposes. Without considering those ancillary spaces external to the makerspace area (like rooms for workshops and meetings), the size of a makerspace varies from 261 m² (Breda, open setting) to 37 m² (Tiel, open setting) with an average size of 100 m².[4] The makerspace accounts for a small percentage of the total library space, typically between 1.5% and 4%. The case

4 Data resulting from own empirical observations and measurements. These data often differ from the information supplied by the libraries in the context of the initial makerspaces survey (KB 2018).

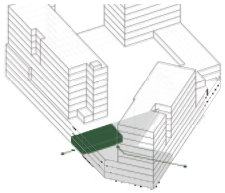
Middelburg library makerspace has a closed storage space and an open setting.





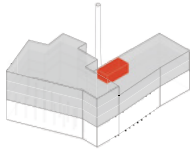
Comparative table building, library, makerspace m².

The makerspace takes a large share of OBA branch Waterlandplein.



of Amsterdam Waterlandplein is remarkable at this regard. Here the makerspace takes more than 18% of the total surface of this branch library, in turn reflecting the makerspace ambitions of this branch. The smallest percentages have been measured in Veenendaal and in Zwolle: 1.5%. The ratio between makerspace surface and number of workplaces[5] is also very diverse, ranging from 2.8 m² per workplace (Amsterdam Slotermeer, Veenendaal) to 10.8 m² (Tilburg). However, these figures can be easily altered by the possible use of ancillary space in peak moments.

The makerspace at Veenendaal takes 1.5% of the total library surface.



Flexibility and adaptations

Spatial and technical adaptations/modifications have been apparently not necessary for initiating a makerspace. Most of the potential interference problems can be solved by time-planning and by reciprocal acceptance within the library. Furthermore, (small) silent rooms are generally present in public libraries. Machines like laser-cutters, vinyl-cutters and 3D printers are not very noisy. They are standard equipped with a filter to gather smoke and dust. Nevertheless, Breda has an additional chimney for the makerspace area. Because of the number of machines that populates the makerspace, including lap-tops and mobile devices, all settings show a large availability of power sockets and have to cope with overwhelming cabling, that can be embedded in (smart) furniture or led along plinths, under the carpets or floating pavements.

Storage embedded in furniture at Leeuwarden dBieb. *Kuijper.*

All makerspaces are rather flexible in their organization, yet in different ways. In closed settings tables can be moved around and organized differently according to the type of activity; in open settings, when makerspace is not in operation the spaces/tables can be

Laser cutters and others are equipped with a filter, like here at Apeldoorn. *Caso.*

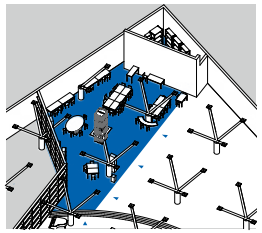
5 Figures calculated by inquirers after observations on site.

Workplaces at Utrecht 'Laboratorium' can be used by others in times of low venue. *Kuijper.*

occupied by regular library visitors while extra tables can be used by the makers when in operation, if necessary. For both situations, the availability of ancillary spaces like workshop rooms, meeting rooms, auditorium helps to manage the peak moments.

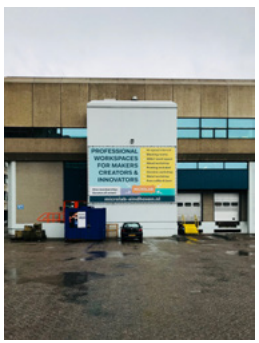
Children produce quite some noise when they are absorbed in a makerspace activity, like (educational) gaming and VR. In 's-Gravenzande the makerspace door can be closed in such cases to minimize disturbance for the nearby reading table. This makerspace is pretty small and filled up with machinery and computers (and even a couch), therefore becoming quite crowded especially at days when children have no school.

Makerspace at Breda library. Tables are available for all visitors when not in operation.



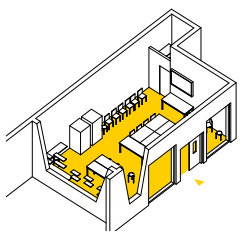
Target groups and space

All makerspaces can be used by all library visitors at opening times. Some staff members have a key of both the makerspace (where applicable) and the library to possibly close-off after regular library opening times – for example when a *hackaton* is held or tasks of 3D printers or laser cutting machines have to be finished (Steenwijk). Of course, this possibility depends on the spatial setting and the borders situation in library (open/closed; independent entrance or not; and similar conditions).



The Microlab, a creative industry hub in Eindhoven. *Kuijper.*

Rather no visited makerspace seriously addresses (local) entrepreneurs, although the ambition of doing so exists. Eindhoven's position at Microlab should facilitate relationships with creative industry, but this is yet to be proven successful. Zwolle offers the makerspace to everybody (also external) and thus to entrepreneurs too, at the condition that the users organize activities that are also valuable for the community. Indeed, this library profiles itself as well as a centre for the community. Veenendaal stated that entrepreneurs would probably need a more professional making space than in library setting.



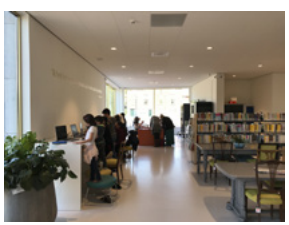
Eindhoven library makerspace at Microlab.

Another target group that is often addressed is the teachers' education (like in Veenendaal and Apeldoorn), with courses about the use of the equipment, coding and programming, and specific education programs for students and children.

Yet, the main target group is the children of elementary school age. Several makerspaces also explicitly address teen-agers and adults. This is the case at Tilburg, Apeldoorn, Breda, Middelburg, and Steenwijk. Elderly people make use of makerspaces as well, mostly for getting acquainted with the 21st century skills (learning how to use tablets and computers) through dedicated meetings organized by the hosting library for this particular target group. Tiel library makerspace organizes activities for elderly people on Wednesdays, in the morning. A group of elderly customers regularly visit Steenwijk's makerspace for hobby, mostly crafts oriented (soldering and 'old fashioned' hardware computer pioneering with circuit boards for example).

The addressed target groups seem to have little influence on the way the makerspaces are designed – maybe the exception is Leeuwarden for the materialization and the design of the interior oriented to children and Lego making experience.

Children gaming at the 's-Gravenzande BiebLab. *Kuijper.*



Children visiting a workshop at Tiel MediaLab. *Kuijper.*

2. Considerations

This paragraph reports considerations and reflections on (critical) aspects detected through empirical observations, staff interviews and mapping; and further elaborated by means of analysis and discussion sessions, including a workshop event with a maker-space experts' panel[6] organized at the Faculty of Architecture and The Built Environment of the Delft University of Technology.

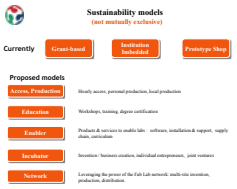
General considerations on conceiving a makerspace in the context of the public library

0. The true value in the landscape of makerspaces in public libraries resides in their people, the staff pro-actively animating the making experiences with enthusiasm, ideas, ambitions. They learn further and develop (new) programs, they make tests and share with peers. They believe in open access and in libraries as centres of future literacy. They, and all the motivated makers, deserve spaces that can match their dedication and that can help them in inspiring, sharing, co-creating, connect across experiences, both digitally and physically; spaces that are designed with the ambition of being the cradle of future society.

However, current modalities of budget allocation for public libraries generally allow for limited investments in makerspace (and in particular in its architecture), by which the

6 Workshop held 2018, August 27th. Participant experts: Reda van der Putten (Bibliotheek Eemland, regio Amersfoort) Peter Troxler (Hogeschool Rotterdam), Eva Visser (Hogeschool Rotterdam), Mirjam Albers (Cubiss), Ingrid de Jong (Cubiss), Carola Oortwijn (Rijnbrink), Emma Bijl (Rijnbrink), Jeroen de Boer (Bibliotheekservice Friesland), Aan Koostra (Bibliotheekservice Friesland), Jantien Borsboom (Digilab Bibliotheek MB), Elvira Caneda Cabrera (Bibliotheek-Informatiesector), Fedele Canosa (architect Mecanoo), Marianne Hermans (KB), Olindo Caso (TU Delft), and Joran Kuijper (TU Delft). See pag 39.

Models for economic sustainable FabLabs. *Boeck & Troxler (2011).*



equipment is an obvious priority. Sustainable business models for initiating a FabLab[7] have been proposed earlier (Boeck & Troxler 2011), in which the location into a public (library) institute scores good mainly due to the less expenses for staff and accommodation. A makerspace can also sustain itself by developing educational programs for supporting parent institutes, like the Frysklab has done (Boer 2015), or by accessing grants / sponsorships. At present, thus, the attention for the physical spatial conditions and design of makerspaces in library context takes a back seat. Yet the spelled out ambitions and the potentialities of library makerspaces in spreading digital literacy would deserve more investments also on the spatial side.

1. The definition of a library makerspace, what types are appropriate and consequently how to design them in accordance with the local library strategy or with a general, country-wide understanding, is not yet part of public library common ground. Creating a common understanding could be a task for the VOB (*Vereniging Openbare Bibliotheken*, Dutch Association of Public Libraries) and/or the KB (*Koninklijke Bibliotheek*, National Library of The Netherlands) as umbrella organizations, for clarifying the potentials of types of makerspaces for reaching strategic goals – yet considering the leading importance of the local specificities.

The SPN (*Samenwerkende POI's Nederland*), an organization joining the nine Provincial Supporting Institution in the Netherlands, has the statutory task of innovating the Dutch library sector. One of the actions comprised under 'Personal Development'

7 These models are indeed thought for FabLabs, however the logics behind the argumentation can be extended to makerspaces in general.

concerns the ‘workplace’,[8] which focuses on digital literacy and making in Dutch libraries. Also this workgroup could contribute to clarify framework and boundaries of makerspaces in Dutch public libraries.

Presently, the main motivation for libraries to initiate a makerspace lays in the choice to render 21st century skills accessible to all. What this exactly means (and how this could evolve with the ever-changing perception of what is required as skills for the 21st century and beyond) did not become clear to the inquirers during the field work, consequently affecting the inquiry issue of the physical form (the design) of makerspaces in relation to a given set of strategic goals. This does not mean that to start a makerspace was an uninformed initiative of the observed libraries. For this they correctly looked into available precedents and settled experiences, learning by and collaborating with successful enterprises like the Frysklab[9] (Willingham & De Boer 2015).

However, while making and makerspaces are internally highly promoted the libraries are still ambiguous in their goals and are likely in search of a more precise framework for the new service for now and for the future.

New literacy. Dedicated VRLab at CODA Apeldoorn. *Caso.* **3d printers at Breda Makersbase (below).** *Kuijper.*

2. The visited makerspaces especially engage into ‘innovation’: the digital skills for the 21st century. Clearly less attention was detected for ‘creation’ (art & crafts) across the inquired pool.[10] There exist more libraries in the Netherlands which offer arts & crafts making but

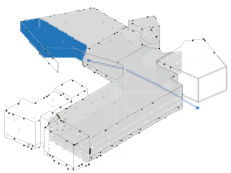
8 Visit: https://www.stichtingspn.nl/persoonlijke-ontwikkeling

9 Visit: http://www.frysklab.nl/

10 The distinction between ‘innovation’ and ‘creation’ is made according to Jochumsen (et al. 2015), as two sides of the same ‘performative space’ coin. The approach of many Dutch library’s makerspaces is a learning-based one, in this (as well) fitting the ‘learning space’ of Jochumsen’s (et al. 2012) ‘Four-Space model’ (see p.13).

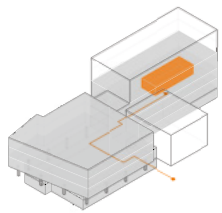
Cultural merging: Eemhuis Amersfoort is an example of cultural centre typology hosting as well art schools and archives. *Caso.*

they were not part of the visited sample. Because the case-studies were selected among the libraries interested into further participation in the project, this detected difference of attention is probably due to the concerns most libraries presently share about understanding position and potentialities of digital makerspaces in library environment. On the contrary, arts & crafts making already knows a longer history in libraries and are felt more connected to amusement than digital making, which is in turn associated to 'learn', likely calling for more 'structured' approaches. Probably the visited libraries were more interested in discussing and showing the digital making possibilities. However, whether this distinction is functional to the aim of spreading 21st century skills is difficult to say, yet it is doubtful. We suppose that the claimed required skills are not only technical, but rather of generating a culture of creative, pro-active learning and entrepreneurial attitude – and these skills can be as well provided by art & craft making (creation). At this concern the Amsterdam Waterlandplein branch is an interesting example as it supports a wider range of making possibilities and connects the two performative modalities.



Breda library shares its accommodation with art schools and other cultural institutes.

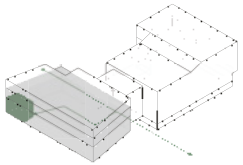
3. Most of the visited libraries (Veenendaal, Zwolle, Breda, Middelburg, Amsterdam Slotermeer, Tiel, Eindhoven, Apeldoorn and Leeuwarden) are presently part of cultural clusters/centres. This is a trend which is increasingly taking place in the Netherlands, in which the library and other (subsidized) cultural services are brought under one roof, with more or less hard borders and a more or less integrated management.[11] This trend is often related to the optimization of public resources and to the growing ambition by local governments of strategically employing culture (Skot-Hansen et al. 2013). At the same time,



Zwolle Stadkamer also hosts education, cultural community, event space.

11 Recent operations of this type in the Netherlands are Rozet Arnhem; Eemhuis Amersfoort; OPEN Delft (former DOK).

Also Tiel library is located in a multifunctional cultural building.



it also relates to the need of cultural services of repositioning themselves (Vallet 2013) in a changing society and in a changing cultural landscape that is increasingly made of hybrid cross-fertilizations (Lessig 2008) and is inhabited by prosumers (Sacco 2011; Ritzer 2012). In these new configurations the makerspace can still be part of the library (or of one other participating cultural institute) or can become part of the building as an institute on its own. This development may suggest in the future new ways to arise of being a cultural oriented makerspace in a contemporary setting of culture-city relationships, with changing, more sophisticated requirements for equipment, for design and for space and a renewed relationship with the library institution.

Makerspace visibility, organization, design and position in library context

4. No own outdoor space is available for makerspaces in libraries. This affects the ability of libraries to create a significant transition space between library public building and urban public space (Giles et al. 2014) that could become a showcase for the library and for the makerspace itself. Additionally, an outdoor space could offer to a makerspace room to extend making-programs, e.g. including gardening and growing/culturing crops; or for teaching the basics of building and construction (for example making a small garden shed) – which could be relevant in certain areas.

5. Referring to the observed cases, the spatial aspects and the specific design of the makerspaces seem not to be seriously addressed among the strategic choices of planning and starting a makerspace. The position of a makerspace in a library apparently derives more from opportunistic considerations than a well-thought strategy. Mostly the

makerspaces are located there were the library could more easily make room for them, sometimes resulting in difficult spatial conditions.

This is understandable and it is a pragmatic manner to get started,[12] yet the question remains of whether a more developed design of the makerspace could boost the value of the operation by creating well-thought, inspiring spatial interfaces between users and makerspace service.[13]

6. The detected spatial indifference regarding position and design of the makerspace is probably due to the fact that a makerspace is a recent addition to the library program and is not yet established as (architectural/spatial) typology inside the library building. This differs from already integrated services as the collections, the auditoria or the art schools that already know a longer tradition in the spatial configuration of the public library. For this, the makerspace seems to be presently considered as a space-neutral institute which is at the moment best served by generic solutions.

Tilburg, LocHal. The 'KennisMakerij'. *Image, Mecanoo.*

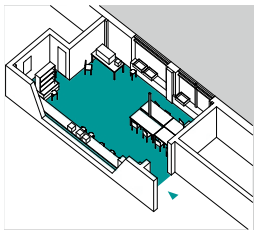
It will be interesting to see which place will be given to making in the next library buildings, like for instance the new Tilburg library at the LocHal where 'making' opportunities are explicitly included into the building program.[14]

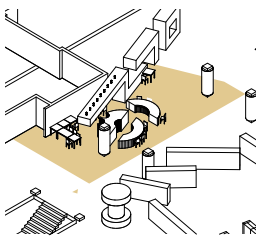
12 With minor exceptions, the budget for running a public library is notoriously limited. The focus lays then on the programming, the staff and on the necessary machines – hardly on high-quality spatial design.

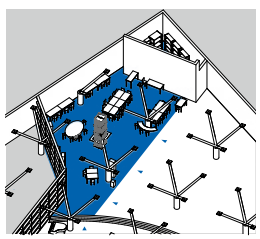
13 Among the 'Design and Development' guidelines for re-envisioning New York's branch libraries, Gilles (et al. 2014) suggests to "*invest in joyful spaces*": "*vibrant spaces that inspires creativity and fosters sense of discovery*" (p. 52). This seems especially appropriate for makerspaces design.

14 From the website of the design architect Mecanoo (https://www.mecanoo.nl/Projects/project/221/LocHal): "*LocHal has seven uniquely designed themed rooms for specialized work, research, learning and collaboration: Digilab, Game Room, Living Library, Knowledge Workshop, Time Lab, Dialogue Room and the Writing Room*".

At the Steenwijk library the makerspace is located at the basement floor.







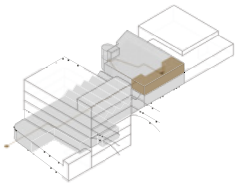
Tilburg (above) and Breda have no standard design.

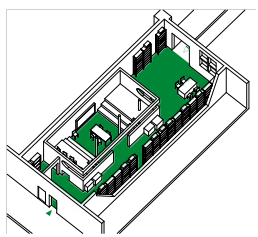
7. In consequence of this opportunistic strategy, some makerspaces were located in the (sometimes windowless) basement[15] (Steenwijk, Middelburg, Apeldoorn) or in places with complicated reachability (Amsterdam Reigersbos, Leeuwarden, Steenwijk) that many makerspaces (staff) would be happy to escape. At the same time, the presence and offer of makerspaces in visited libraries is often not evident in space, notwithstanding all the advertising screens and the boards and the signage and the wayfinding tactics employed. By this, makerspaces scarcely promote themselves in a visual way or act as a showcase for themselves and for the hosting library. Visitors must be then informed in advance about the offered possibilities and must already know about their location in order to find them. This usually happens through (local) newsletters, much less by visual/contextual means.

8. The design of the makerspace is basically the same in all visited situation, excepting experiences like Tilburg (open desk at the centre of the library) and Leeuwarden (dedicated design for Lego users). Breda too paid attention to the design of the makerspace area: a local artist configured the interior by low-budget intervention, (re)using common/cheap materials.

The detected spatial neutrality could constrain the realization of makerspace programs, because the spatial form/organization could affect certain tasks. For instance, as makerspaces mainly claim the educational goals of digital literacy, it could be interesting for their spatial organization to learn from school architecture in which different floorplan

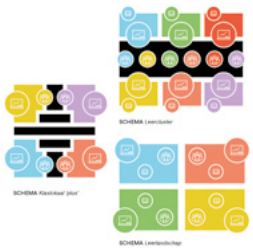
At OBA branch Reigersbos the makerspace is located at the first floor.





Leeuwarden library makerspace has an own identity.

15 Being located in a basement is not per se a negative spatial condition. It could even stimulate an 'underground' identity, a own micro-culture which could appeal some categories of users (e.g. teen-agers). Yet it should be strategically conceived and designed for this aim.

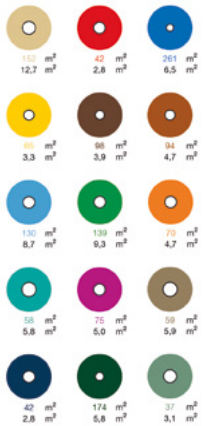


Three typologies for learning spaces in schools. *Coen de Vries, TU Delft student.*

articulations can support the educational purposes in particular for what it concerns the balance between group work and individual work (and creative work) (Schneider 2014).

The uniformity of the most makerspace configurations is apparently in conflict with the public library orientation towards local embedment. It could have been expected library's makerspaces to contribute to local identity and to a specific making context for/by own users, therefore reflecting the diversities among territories and the individuality of the place.[16] Some of the visited libraries are in the same building as the local city archive (Veenendaal) or a museum (Apeldoorn) evoking a local identity and possibly stimulating cultural exchange. How could the makerspace gain from this presence?

9. Although some makerspaces can count upon ancillary spaces, generally when the number of visitors reaches a peak they still struggle with size. How big should a makerspace be? Willingham (2018) suggests workshop areas of about 7 m² to 9 m² per person. In comparison, the observed cases in the Netherlands show lower values per workplace, typically from 3 m² to 6 m², with an average of 5.4 m² per workplace across the inquired panel.[17] However, it is not always useful to dictate hard figures for library makerspaces, but for general orientation. A well-balanced system in which makerspaces might grow or shrink according to moments (typically a hard core surrounded by more hybrid workplaces) seems to be a realistic possibility also in order to avoid annoying vacancies in times of not-operation or low venue. However, the impression is that in general the actual

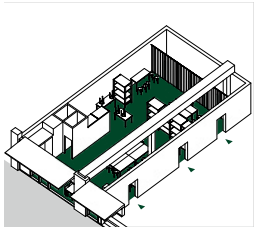


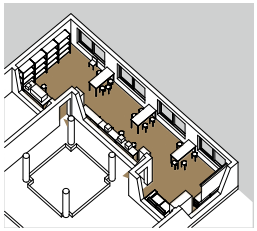
Comparative table makerspace workspace m².

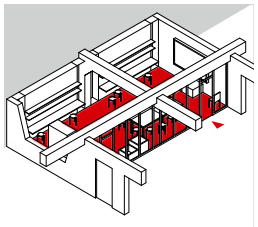
16 Also in terms of community engagement. For example, in the 'City of Amsterdam' users of makerspaces are challenged to think about the city's configuration during urbanization games. Local community awareness is part of this program and tries to involve (young) people into local initiatives created by the City of Amsterdam's planning bureaus.

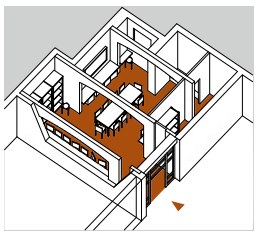
17 Values calculated by the inquirers after empirical observation on locations.

Closed makerspace settings.









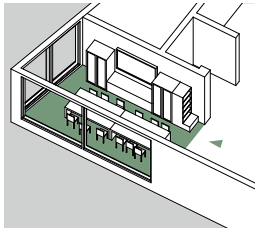
library makerspaces are rather small areas which hardly have the potential to generate a positive spatial engagement (presence, activities) with other library services.

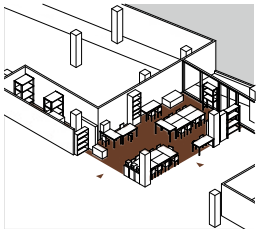
10. The most makerspaces are configured in closed setting – this is typically a room separated from the rest of the library. The advantages offered by a closed configuration above an open one relies on: the possibility of creating distinct dedicated area, the managing of the potential noise (think of a group of loud children) and the protection of the equipment On the other hand, the makerspaces can become a ‘black-hole’ of vacancy inside the library in time of underutilization as many closed configurations show a transparent wall towards the library.

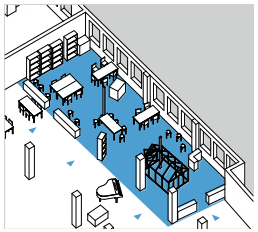
The open settings can be better appreciated for the greater possibility of mingling with the other library services, indirectly involve other visitors and act as a showcase. These spaces can informally grow or shrink according to the busy moments and when ancillary space is available. Disadvantages are the possible production of noise, the impression of ‘taking over’ the library, the need of spatial solution to ‘protect’ some equipment, (typically lockable furniture, more or less integrated into the design - see e.g. Leeuwarden), the preparation of the scene over and over again - for instance in the case of additional spatial arrangements which can take some time, like setting up a virtual reality environment.

An interesting spatial solution is the one in Leeuwarden which adopts a more hybrid configuration, with an overlapping zone between overall library program (collections) and the dedicated makerspace. For this a multi-purpose architectural object is placed in the room. In general, there seems to be opportunities for designing more complex spatial relationships between makerspaces and library space.

Open makerspace settings.

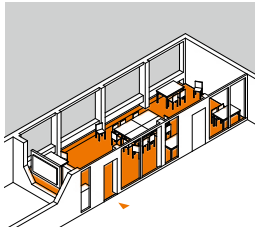


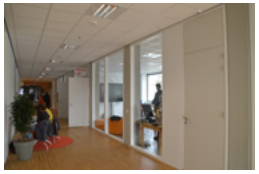




11. Spatially the most successful makerspaces, meaning those apparently better embedded into the library,[18] seem to be those holding a more visible location in library and/or in urban space, or that are better connected with another library service/offers/programming. Indeed a 'better' location in own library, possibly close to entrance and good visible from urban space, is broadly desired by the inquired makerspace staffs – those persons which are daily busy with running the service. Several visited libraries have now plans to relocate the makerspace to a more visible or central location, in this starting to recognize a higher value to their library makerspace. It will be interesting to see which criteria and goals are set for the relocation plans, and whether the relocations will go together with more ambitious designs.

Breda makerspace is well visible from the entrance area. Colors and wayfinding carpet art make it attractive. *Kuijper.*





Zwolle makerspace is located in a corridor together with other similar generic spaces. *Caso.*

Spatial aspects related to the makerspace programming in library context

12. At the moment the makerspace seems to hold weak relationships with the other services/offers/programming and with the collections. Libraries are rather organized in self-referring entities, like islands, and do not seem to gain much added value from their increased programmatic complexity. The impression is that the makerspace is still felt as an 'addition of a stranger' to the library organigram instead of being an integral part of it. A library strategy of internal programmatic cross-fertilization is still in its infancy, and this is especially true for the introduction of the makerspace.

A spatial approach to these potential cross-relationships could lead to more interesting design solutions that could inspire a more fertile anchoring of the makerspace in the library (Levien 2011).

18 Thus in spatial sense, not measured by popularity/venue.

Tilburg DigiLab is located in-between different library services, at the centre. *Kuijper.*

13. The wanted relationships between the makerspace and the library program are often twisted. This also holds for the focus of the library in general and the makerspace in particular. For instance, some consider an explicit relationship/link to the young/children space as desirable, because the makerspace activities are more often directed towards that target group; others are just willing to escape this relationship, being afraid to be labelled as a 'children affair' only. In general, a stronger structural spatial relationship with additional workshop/meeting spaces or auditorium confers additional strategic flexibility in operating the makerspace in different target group conditions, but it is not a sufficient condition. To establish successful space-program relationships is not simply matter of proximity but rather a matter of integral spatial design.

CODA library makerspace is located in the basement, besides meeting spaces, study spaces, an additional workshop room. *Caso.*

The spatial meaning for the community of the makerspace in library context

14. Structural active engagement of libraries in promoting the makers and the products of making (both innovation and creation) has not been detected among the visited makerspaces. Exploitation of the 'made' is scarcely helped and thus also not encouraged. In this the library could act more as e.g. a community 'marketplace' or like a participatory, co-creative platform (Hvenegaard Rasmussen 2016) offering makers the opportunity to stage own ideas to others. This could largely improve the status of making in library and community. An example for this could be the Demoteket initiative of Copenhagen public libraries (Jochumsen et al. 2015) which aims to include the products of library users (music, writings, movies, etc.) into the library collections – thus making them accessible to all. Another interesting example is the Library10 in Helsinki (Jochumsen et al. 2015), which

Helsinki Library 10 is specialized in music. *Image, found on Pinterest.*

is a library initiative largely devoted to performing.[19] At Library10 users can create, show and publish own cultural products. The library provides help and equipment for e.g. publishing a book, it has record-studio's and rehearsal rooms; it organizes many events and happenings, it is a stage for the local (cultural) community.

The 'Waiting Room' at Colchester has been inherently a community making place and a host for local events and a meeting point (Willingham & De Boer 2015). These examples stimulate a 'performative attitude' towards inhabiting the library – to which a dedicated design could offer an inspiring stage.

A music event at The Waiting Room, Colchester UK. *Image, https://metalrecusants.com/2014/10/24/...*

15. The visited makerspaces generally lament the lack of enough educated staff capacity for their functioning, which results in limiting the opening hours and the opportunities for the visitors to engage in a maker culture. Also, most makerspaces focus on primary school children and therefore they experience peak moments at no-school times. Spreading 21st century skills is a high priority of most of the makerspaces, but staff members should be trained for these goals. Several makerspaces enjoy the contribution of volunteers, but not every makerspace can easily find enough available volunteers. Networking across Dutch makerspaces and possibly the affiliation to international makerspace networks, if further implemented, could contribute to tackle these problems by facilitate appropriate staff training and by rendering assistance available online too.

19 Both Domoteket and Library10 are more directed towards the 'creation space' in the performative domain sketched by Jochumsen (et al. 2015). However also the innovation spaces can engage the community in a similar way. Concerning Library10, visit also: http://modelprogrammer.slks.dk/en/cases/inspirational-cases/library-10-helsinki/. Library10 recently moved to the new Helsinki central library.

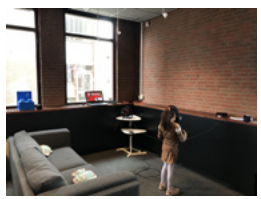
Such a networking experience is apparently not part of the visited settings, at least not visibly and not for the users, and it is not expressed in spatial terms. The relationship between the (digital/digitally supported) networking and the lay-out/design of the physical makerspace could deserve more attention in the light of enhancing the experience of remote networking and make it visible, for instance by creating digital spaces as windows/gates connecting among physical realities.

The library makerspace in relation to the space of the user's individual performing

Staff assisting users at Medialab Tilburg. *Kuijper.*

16. Differently from the commonly self-directed practice of library services (self-helping: pick yourself a book from the shelf; self-check-in/out; make scans and copies by yourself etc.) the interactions with the machines in a (digital oriented) makerspace are mediated through the staff, because of obvious reasons of safety, misuse, lack of knowledge, complicated operation, economic value of machines. However, as users get more and more familiar with commanding the equipment the possibilities for more unmediated relationships between user and makerspace will arise, somehow relaxing the need of library control on making process. In the future this could enable different conditions e.g. as to the flexibility in space and the spreading of equipped performing places in different library locations.

Self-directed use of VR at 's-Gravenzande. *Kuijper.*



17. Little room for privacy in making has been observed in all the visited settings. Indeed the experience is mostly done in group and/or under supervision. Yet, is this as well a form of ethical control on the makers production? Would one user be allowed to make e.g. pornographic material? Or music texts holding unethical content? There is an evident tension

in the interpretation of the role of libraries for guaranteeing the independence of the user that generates own self-directed content, against the degree of privacy offered by the making experiences which do not equal the other possibilities (reading, writing, gaming). Is there a role for spatial configurations to act as a mediator for these instances? Should the making library offer a larger variety of conditions between private and public? Will the maker's privacy become one hot ethical issue in the next future?

The makerspace as potential business-case in library context

18. Some could believe that makerspaces are a new business-case for libraries[20] in the entrepreneurial sector and an alternative source of income – at least for matching the makerspace expenses.[21] To approach (local) entrepreneurs is sometimes mentioned by library makerspaces as possible option (KB 2018), but it is not really pursued as the inquirers have not found cases in which this option was actively attempted.[22] The distance between the potentials/scope of the library enterprise and those of the real business is still very big: machinery range, types and variety of materials, staff availability and expertise, volumes of production and alike are concrete factors constraining the possibilities. The library makerspace could have the function to unlock bottom-up creativity and test some basic intuitions, which is the mechanism at the base of creative industry, but at the

Eindhoven library makerspace at Microlab. *Caso.*

20 With reference to the financial business-case, not to the socio-cultural one which is evident.

21 About the financial sustainability of FabLabs, see Boeck & Troxler (2011). Boer (2015) describes the business-case of the Frysklab as offering of services and programs to parent institutions.

22 Eindhoven's library makerspace experiment is very interesting as this one is located in the Microlab, a dedicated creative industry building where craftsmen/design firms are operating. It will be interesting to hear about the final evaluation.

moment can hardly become a competitive entrepreneurial makerspace workshop[23] – at least until a deeper maker economy arises that can structurally sustain makers throughout (Holman 2015). If the library makerspace seriously aims to engage entrepreneurial making, then a much more ambitious setting should be created, with specific spatial and programmatic characteristics and an adequate budget / staffing.

The main lessons learned from observing makerspaces in Dutch library context

19. Inspiring makerspace spatial practices observed by the inquirers:

- Tilburg for the embedding in the library and for the potential to fertilize the relationships with different types of visitors and library services;
- Amsterdam Waterlandplein for the spatial autonomy (own entrance, toilet, pantry) and for the widespread making options;
- Amsterdam Slotermeer for the urban visibility;
- Apeldoorn for its organization into different spaces (VRLab, workshop area, making area);
- Leeuwarden for the specific interior design and use of educational Lego (sponsored through a local alliance);
- Breda for the internal visibility, presence and own identity;
- Tilburg, Veenendaal, Apeldoorn for the flexible active ancillary spaces for peak moments or activities where focus or silence is needed;

23 However, the entrepreneurial perspectives of making in library context are nuanced when including ability of self-activation and/or artistic creativity like writing, music, act performing. This could more easily find a platform in the library as these services make increasingly often part of the library offer, especially in the case of the mentioned cultural clusters.

- Middelburg for the potentials of the close relationship with the ‘writing lab’ (creation);
- Makerspaces with their own physical storage space;
- Amsterdam’s branding *Maakplaats 021* for common features across branches (visual identity, furniture, ambition) and for the engagement in (less favoured) areas.

20. Main spatial issues observed by the inquirers:

- Steenwijk is isolated because its position in the basement and the difficult routing;
- Steenwijk for the limitations due to the safety measurements of the bank (located in the same building than the library) whose bank caveau in the basement borders the makerspace;
- ’s-Gravenzande for the somehow odd relations between makerspace (children, noise) and the reading table (silence, elderly people, community service);
- Tilburg for the potential noise and interference with other library functions: risk of ‘taking over’ the library, often confused with information desk;
- Eindhoven suffers from the physical detachment from library, potentials of relationships with creative industry are not yet made true;
- All makerspaces but few: uniformity and genericity of interior design (visual identity, furniture);
- Scarcity of trained staff/volunteers in relation to demand;
- The overwhelming learning-oriented approach to digital making, with the related design choices, which risks to overshadow the pleasure factor.

3. Five challenges for a (next) future agenda

The future is unpredictable. Probably, over ten years there will be no longer a discussion about makerspaces in library context because making will be a common feature in public libraries. Or maybe there will be no libraries any longer, not in the sense we understand them now, but making landscapes for self-directed (cultural) development. Perhaps making will just disappear from libraries and rely on own facilities. A Dutch investigation on the Library of the Future (SIOB 2014) foresees a major role for public libraries in the development of a knowledge society devoted to a knowledge economy, and the dissemination of the necessary skills. This library will act as a connector at many levels: among people and information; among people each other; with and within the community; among different types of source of information (SIOB 2014). The makerspace development fits these predictions, but poses as well new questions about the future public libraries 3.0 or 4.0 as they will still engage in similar discussions about own 'updating' as nowadays. How will they continue to grant access to relevant knowledge and tools to all, regardless of budget, gender, age, religion? how will they still realize local community embedment? and which forms will this all take in the future?

Inspired by the empirical observations, the discussed potentialities and the critical aspects, the following five challenges are plausible work-hypotheses regarding the spatial aspects of the future of makerspaces in the context of the public library. These hypotheses have been selected and developed in an internal speculative brainstorm by following an abductive type of reasoning. The challenges overlap and are complementary with each other, forming in this way a spatial agenda for discussing the future of library

makerspaces. These challenges are activist in nature in order to stimulate discussion on makerspaces in the Dutch public libraries. They concern: the integration of the makerspace in library and community; the identity and specificity of the makerspace; the makerspace as a place for leisure activities; the makerspace networking as a cultural infrastructure; the making culture in development.

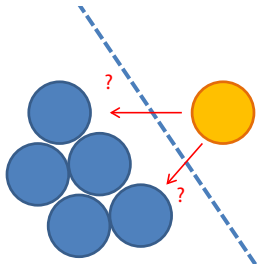
Make It Belong!

This first challenge addresses the makerspace in the context of the relationships among the different offers of the contemporary public library program, and their extension to the public realm. It refers to the crucial topic of the integration of the growing programmatic diversity of the library into a narrative able to generate added (cultural) value, and able to share this renewed value with the urban public realm.

These relationships have been found to be weak during the inquiry, probably because the makerspace is a recent addition to the public library program, whose development is still in its infancy. Yet the issue of the introduction of 'making' as tool for self-directed (cultural) development in the library institute goes hand in hand with the issue of the servicing plurality of the contemporary library and of the potential benefits this plurality can enable. The contemporary library offers room for meeting, for learning, for inspiration, for performing (Jochumsen et al. 2012); the present Dutch Library's Bill (WSOB 2014; Lankhorst 2015) defines five core functions[24] for contemporary public libraries in the Netherlands. In theory

24 1: The library as warehouse of knowledge and information; 2: The library as a centre for development and education; 3: The library as a source of inspiration for reading and literature; 4: The library as an encyclopaedia of art and culture; 5: The library as a podium for meeting and debate.

all these areas overlap and collaborate with each other, but what concrete forms do these overlapping assume, and in how far are they able to generate new (hybrid) content?[25] In which new ways does the library interact with the urban realm, and what opportunities does the makerspace offer at this regard?



A stronger integration between the makerspace and the overal library servicing could result in the improvement of cultural cross-fertilization.

The hypothesis here is that these relationships should have to be directed in order to facilitate added value through cross-fertilization, in this including the extension of the library towards the city for a better involvement of the public realm. The assumption is that the combination (hybridization) of (cultural) content is the enriching potential enabled by the increased variety in (cultural) offer. Accordingly, the spatial assignment for the makerspace will be to visualize and clarify these opportunities for all. As the spatial organization in libraries is presently still centred around the autonomy of the services (the different functional islands) and not yet enough around the users (the serendipity potential, the cross-fertilization, the borders), which elements can work as 'glue', offering the connective structure across the multiplicity of contemporary libraries? What position can the makerspace take in this? How can the internal library relationships be shaped and materialized

25 Hybrid as by Lessig (2008), the creative ability to remix different cultural products in a new expression.

in an inspirational way serving the library in general and specifically the makerspace? What types of overlapping between public library and urban realm can be realized, in which the makerspace can participate? The spatial issue at stance is the physical integration / anchoring of the makerspace into the public library offer and the engaging of the urban territory through the renewed 'making' meaning of the library: cross-fertilization, visibility, urban engagement.

Make It Your Place!

The second challenge refers to the relationships among local specificity and the design of the makerspace. In doing this it addresses the issue of the identity of the library as part of a territorial setting with an own specificity made of local programmatic and physical characters.

Although with few exceptions, the makerspaces observed during inquiry showed neutral spatial characters along with a design that is generic in form and in function and that hardly makes visible local specificities or materializes a particular (community) identity. This challenge is strongly connected to the theme of the changing perception of the public library by the community, in which the library is increasingly supposed to be representative and responsive to local conditions: a relevant public place embedded of local meaning that pro-actively proposes itself as a 'platform' (Lankes 2012) for 'connections'. Against this assumption, the design of makerspaces in libraries is too often generic as it is modelled around the genericity of the equipment: several desks, a set of 3D printers, other tools like (laser) cutters, enough power sockets. Also, the contemporary library strives

for becoming a ‘third place’ (Oldenburg 1989; Vos 2017), a social reference and a familiar ‘safe’ place in the community. Which makerspace actually fit this description? Many public libraries are situated in historical buildings, monuments embedding the local culture, and many Dutch cities are dealing with the legacy of their former industrial vocations; yet when it comes to the makerspace this one shows a neutral, identity-devoid setting. Willingham (2018) suggests that the first task of a newly established library makerspace should be to ‘make’ the furnishing – as a sign of bottom-up appropriation by users. However, more possibilities for realizing specific makerspaces can be imagined.

In spite of the current neutrality and uniformity, a makerspace could assume many forms in order to reflect / distinguish the identity of the community.

The hypothesis is that the makerspace should express local conditions and show an unique stronger individuality, not only in terms of programs but as well physically, by being recognizable environments that are well-embedded in the context. The assumption is that specificity in space is a tool for the generation of value, in this way opposing to the present diffused genericity of spatial standardization, and it is a mean to build community identity. Accordingly the spatial assignment is to discover and materialize the genius loci in the design and lay-out of the makerspace as a specific place in a specific library building conceived for a specific community with specific ambitions. This assignment is twofold: on the one hand, it concerns the identity in design of the makerspace as such, yet able to support the chosen functional program; on the other hand, it refers as well to the potential

of the makerspace for becoming part of the local 'social' public realm, an attractor for people's gathering regardless of participation in making activities. What design could emphasize the local specificity? How to create identity through makerspace architecture? What synergies with local cultural activities can be facilitated by the makerspace design? How to create a place that is representative of the users and able to generate local identity and belonging? Can the makerspace become the 'third place' of the future, the 'community kitchen' overcoming the 'community sitting-room' concept? The spatial issue connected to this challenge is the creation of identity and 'placeness' in library makerspace and in its urban embedment: unicity, representativeness, cultural anchoring.

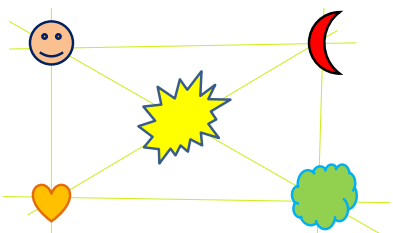
Make It Fun!

This third challenge approaches the interpretation of the makerspace as a learning environment: a laboratory for the development of 21st century skills by users, particularly in the form of 'digital' making. It concerns the issue of the relationships between performing space and learning space[26] in the public library, in relation to the desired identity.

The inquired makerspaces in libraries mainly show a learning finality, also as business-case by serving allied parties like (primary) schools. They offer courses, instructions, workshops and trainings for a variety of target groups, especially children, making a great job of diffusing digital literacy and familiarity with new technologies. Yet, the rationale for visiting a library is not always functional to (self-directed) learning, and this also applies to the makerspace. The leisure factor still has a fundamental importance in profiling library

26 Often quoted in this work: Jochumsen (et al. 2012). In this case the distinction between performing space and learning space is taken as a discriminant for speculating on the future, in the light of the inquired case-studies.

services across patrons and users, contributing to an attractive, playful and relaxing environment. Furthermore, the steady growth of the 'leisure' sector among urban economies is evident, and it is rapidly transforming into a life-embedding condition (Metz et al. 2002; Maas & Sverdlov 2016). Will future cities be populated by a new, more radical type of *Homo Ludens* (Huizinga 1949)? The constructionist learning-by-doing approach (Papert & Harel 1991) in makerspace didactics should as well cherish the performative, leisure side of making as distinct from the pure 'learning' activities. Programs and workshops offered by library makerspaces use 'fun' as a key to techniques and equipment, by brewing e.g. a key-hanger, a baby-doll, or an elementary computer program. Nevertheless, where does the border between (leisure oriented) performing and learning lay?[27] Could leisure in performing be more hard-core: 'radical fun'? Could a stronger distinction between performing and learning contribute to expand audience in library makerspaces?



A leisure approach to library makerspace that complement the educational finalities could reveal the full potential of making culture for the public library.

The hypothesis at this regard is that the present overwhelming focus on learning in library makerspaces overshadows the amusement factor, transforming makerspaces in school extensions by this dealing with users as students – thus generating a somehow

27 Evidently many overlapping exists between performing and learning, also in the light of the quoted constructionist approach to education, yet it would be wrong to eliminate this distinction.

associated ‘compulsory’ image.[28] The assumption is that the development of serious leisure content by library makerspaces is a positive, efficient drive towards the engagement of a wider public from the community, for which a sharper distinction between learning and performing would be recommended for avoiding to flatten the makerspace offer to only match the overlap between the two spaces. Accordingly, the spatial assignment is to conceive ambitious spaces connected to the makerspace that are lay-outed as arenas for entertainment, gaming and amusement, that are landscapes of performative fun. What spatial configurations could help leisure performative activities in public library context? What spatial characters emphasize serious ‘entertainment’ factor in makerspaces? How can the leisure content be made visible to library users? Is a ‘fun landscape’ the possible spatial connector in the future public library? How does the design of the future library connect and integrate different types of ‘fun’? The spatial issue related to this challenge is to design playful, engaging makerspaces like part of Cedric Price’s ‘fun palaces’ (a.o. Mathews 2005) in which the leisure factor is an inviting drive for participation: fun landscape, gaming arena’s, engagement.

Make It an Infrastructure!

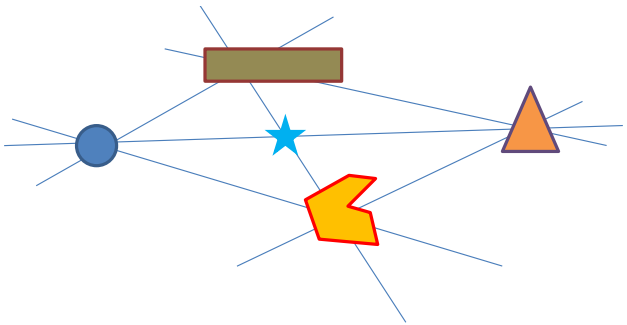
This challenge elaborates upon the potential of connectivity among comparable experiences diffused on the wider territory, for the creation of an integrated responsive and collaborative environment. It addresses the issue of the relationships between physical building and virtual space in library makerspaces, in the form of the materialization in place of the digital communication.

28 Obviously the very relevant learning content of performative makerspaces is not under discussion. The hypothesis is that makerspaces should be as well able to generate serious leisure content.

Notwithstanding that the nature of the inquired makerspaces is mostly based on advanced (information and communication) technologies, the inquiry has shown that little is felt in physical library makerspaces of this ever-present virtual world and of the related opportunities. Makerspaces often participate in larger (remote) networks, but the translation of this extended experience in space and territory is limited: apparently they do not form together a single system, an infrastructure, but operate singularly apart. The metaphor of infrastructure applied to library and makerspace have been used earlier (Matterns 2014; Hollman 2015) in order to conceptualize the meaning of the libraries for the communities and the territories, but especially to point out their potential nature of being interconnected, of forming a system. In particular, when it runs on digital platforms or it adopts models based on advanced (open source) technologies (like the FabLab), the networking and the associated co-working/co-creation is inherently part of the making experience – both as it takes place remotely (being part of a nation-wide/global system to share with) or as it happens locally, creating opportunities for sharing and collaborations within the surrounding community. Networking belongs to makerspaces, for which an infrastructural approach to the system can produce added value. How does the extended networked makerspace manifest itself in library environment? Which conditions are connected to the creation of an infrastructural system of makerspaces?

The hypothesis is that the networking among experiences that happens apart in space, being it a local, national or international context, valuably extends the makerspace quality by linking it to a constellation of opportunities through virtual connections. The assumption is that library makerspaces are the gates, the connecting windows that can render virtual communication as solid and concrete as the physical exchange by

materializing an interconnected system made of peoples and opportunities. For this, they deserve to be designed as infrastructural centres. The related spatial assignment is to render the opportunities visible and inspiring for all users, breaking through the barriers of physical proximity.



The creation of a civic cultural infrastructure of library makerspaces remotely linked in a networking structure would enhance ubiquitous co-learning, co-creation, sharing.

What spatial organization is able to accommodate the infrastructural challenge? How can an infrastructural approach to makerspaces across territories be made visible in public libraries? What spatial solutions facilitate (remote) co-actions? How can the design of the physical place inspire all users to explore and gain advantage from the virtual spaces and their connectivity? Are there new forms of collective actions across the time-space boundaries to be materialized in place? And what will bring the future integration of virtual networking and physical space, when extensions of the physical reality happens in forms like virtual and/or augmented reality? The spatial issues of this challenge addresses in particular the creation of connecting gates between the physical space and the virtual space of communication and co-creation: connecting windows, remote communication, integration of physical and virtual space.

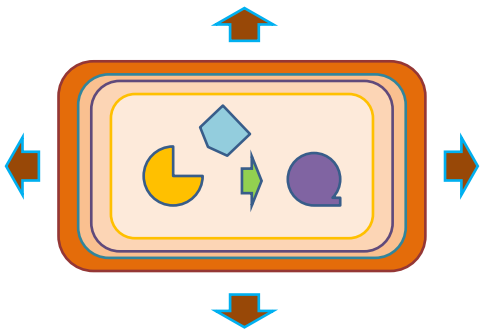
Make It a Culture!

This challenge deals with the changing modalities of cultural behaviour in libraries and with the changing approach to library services. It regards the issue of a growing pro-active attitude in interacting with the society by cultural audiences and library visitors.

Observed libraries already initiated this cultural change by assuming more and more an active behaviour in relation to own services and bringing products in cultural markets. Their approach is no longer just limited to managing the collections. In turn, this growing pro-active attitude by libraries and library staffs increasingly meets the new pro-active attitude by library visitors. The development of makers and makerspaces in present society and the increase of their presence in public libraries can be placed in this light,[29] as part of the change in the way in which culture is produced, consumed and exchanged (see Sacco 2011). Future foresights (EU 2015) prefigure a society in which autonomy, life-long learning and an entrepreneurial attitude will become ever more fundamental values for participating in society. This is not only an issue of digital literacy, but of acquiring the skills and the attitude in order to act as a 'prosumer' (Toffler 1980; Sacco 2011; Ritzer 2012), an evolving person with a problem-solving and critical approach towards the evenly rapidly changing social development. Accordingly, makerspaces in libraries should not be simply considered as another additional service but as the cradle of a new culture which eventually will interest the entire library institute. It is a paradigmatic change: the new culture will require new types of engagement between library, makerspaces and community, like marketplaces / stages for facilitating the dissemination of making products of innovation

29 See at this concern the first chapter of this book, p.15–18.

or artistic expression.[30] Indeed, the next future will confront societies with the continuing advancements of technology and with the rise of new superior technologies people will need to be familiar with: DNA and bioengineering, personal robotics, food printing, symbiosis, dynamic materials. How to prepare the library and its makerspace to meet the future challenges? How can the library makerspace help in developing a learning, pro-active making culture in the community, and how can it keep supporting the future requirements?



The arising paradigmatic shift towards a Culture 3.0 phase characterized by prosumption and 'liquid' societies also requires a paradigmatic change of the public library in order to prepare for a future of new, far-reaching technologies and related literacy.

The hypothesis here is that making will represent the next library identity in future, by which the relationships between library services and visitors will be influenced by a 'prosumer' attitude. The assumption is that the development of 21st century skills especially lays in the creation of a renewed culture of active participation, doing and enterprising – which render the library resilient and able to face the technological challenges of the future. The connected spatial assignment for makerspaces in library context will be to design spatial frames of action which can evolve alongside the evolving society and

30 This would be useful not just in order to create and support a dedicated making economy, but to create conditions for a better human capital building, as observed by Lessig (2008).

that structurally support the required technology literacy in time. Accordingly, flexibility and changeability will acquire even more importance in the future makerspace design, but this will extend further to involve all internal and external relationships of the library. This assignment has therefore two sides: on the one hand, the internal organogram of the library should be reconsidered in the light of the changing approach to culture; on the other hand, the library makerspace should concretely involve the community in this changing approach by supporting the products and modality of making culture throughout. What spatial characters will such a library need in the future in order to express its cultural role? Which forms will underline the new cultural position of the library, both internally and in relation to the urban setting? How will the building regulate the relationships with community and urban space, when making is the leading value? Will there still be a distinction between the makerspace and the other services? How will the design of the public library change, when making becomes the main *modus operandi*? The spatial issue at stance in this challenge refers to the creation of a making culture as shared common ground to accommodate future changes and generate community binding: flexibility, changeability, marketplace, stage, construction.

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3d printed miniatures at Breda's 'Makersbase'.
Caso.

Makerspaces in Dutch Public Libraries

This Atlas reports the findings of a field investigation on fifteen makerspaces in public libraries in the Netherlands. It makes visible the current situation of the introduction of 'making' in public libraries through the mapping of the spatial choices of libraries in equipping and furnishing their 'performative spaces'. On the basis of the detected spatial conditions, the study also attempts to point out generic and specific choices made by libraries and makerspaces. For instance, the most libraries prefer closed configurations above the open ones, for different reasons. In Dutch libraries the makerspace is more often empirically constructed than designed, and it holds scarce relationships with the urban scale. Also the internal relationships towards other library programs could acquire more significance in the view of cultural cross-fertilization. On the other hand, there is a wide belief across the visited situations about the potential of makerspaces in the framework of the public library. New plans are conferring visibility to this new library offer. Although highly promoted, however, there is still a fragmented understanding of what a library makerspace actually is or should be, what types and programs are necessary to form a strong common ground across Dutch public libraries. The spatial assignment for future 'making' libraries should help to create a major identification between cultural role of the library makerspace and the community of reference. At this end, the final chapter of this study proposes a set of speculative assignments for the future by tackling: the integration in the library and in the community (Make It Belong!); identity and specificity (Make It Your Place!); the makerspace as leisure palace (Make It Fun!); the makerspace cultural network (Make It an Infrastructure!); the making paradigm (Make It a Culture!). Altoghether, this study represents a possible agenda for the future of making in library context.

Makerplaatsen in Nederlandse Openbare Bibliotheken

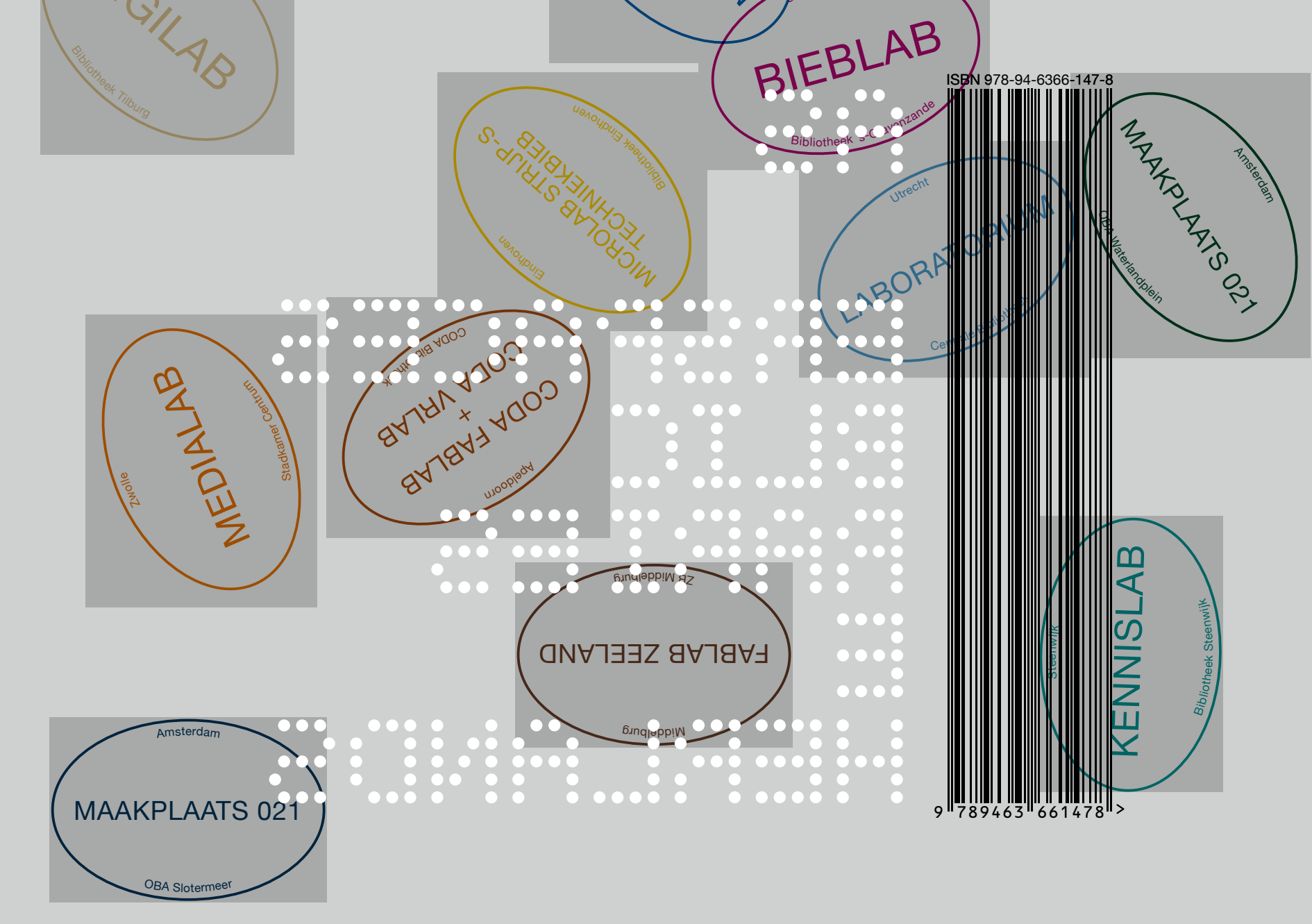
Deze Atlas bevat de bevindingen van een veldonderzoek naar vijftien makerspaces in openbare bibliotheken in Nederland. Door het in kaart brengen van ruimtelijke keuzes die gemaakt zijn in bibliotheken wordt er zichtbaar hoe het ‘maken’ geïntroduceerd is in openbare bibliotheken. Het gaat hierbij om hoe de bibliotheek wordt uitgerust met deze ‘performance’-ruimtes en de inrichting hiervan. De generieke en specifieke ruimtelijke keuzes gemaakt door bibliotheken en makerspaces worden toegelicht. De meeste bibliotheken geven bijvoorbeeld de voorkeur aan gesloten configuraties boven de open. In Nederlandse openbare bibliotheken is de makerspace vaker empirisch geconstrueerd dan ontworpen en zij heeft nauwelijks een relatie met de stedelijke schaal. Ook zouden de interne relaties met andere bibliotheekprogramma’s meer betekenis kunnen krijgen door culturele kruisbestuiving te faciliteren. Nieuwe plannen geven zichtbaarheid aan dit nieuwe bibliotheekaanbod. Hoewel sterk gepromoot is er echter nog steeds een gefragmenteerd inzicht in wat een bibliotheek makerplaats eigenlijk is of zou moeten zijn, welke typen en programma’s nodig zijn om haar een sterke gemeenschappelijke basis te geven in de Nederlandse openbare bibliotheek. De ruimtelijke opdracht voor de toekomstige ‘doe’-bibliotheek zou moeten zorgen voor het creëren van een sterk identificatie tussen de culturele rol van de makerplaats en de referentiegemeenschap. In het laatste hoofdstuk van deze studie wordt een reeks speculatieve opdrachten voor de toekomst voorgesteld: de integratie van de makerplaats in bibliotheek en gemeenschap (Make It Belong!); identiteit en specificiteit (Make It Your Your Place!); de makerplaats als vrijetijdspaleis (Make It Fun!); het culturele netwerk van makerplaatsen (Make It a Infrastructure!) en het making-paradigma (Make It a Culture!). Deze studie vormt een mogelijke agenda voor de toekomst van making in bibliotheekcontext.

Thank you!

Precious contacts at the visited libraries made it possible to organize in a short time an efficient and meaningful visit to fifteen makerspaces spread all over the Netherlands:

- Janita Olthof
- Karlijn Muller
- Fons Steggink
- Jojanneke Wehmeijer
- Sjoerdtje Schaap
- Alinda Mastenbroek
- Margot Appelman
- Jessie Hanssen
- Arjen Nijboer
- Elisabeth Slager
- Marijke van den Berge
- Marianne Elsjan of Wipper
- Suzanne Hoogeveen
- Sascha van Tongeren
- Maarten Lammers
- Jose Remijn
- Wieke Heikoop
- Sjors Tomlow
- Niels Dinkelaar
- Alfred van Benthem
- René Houben
- Jantien Bosboom
- Donald van de Zanden
- Marianne Hermans

Through them, the authors would like to express their sincere gratitude to all the many persons who took part in the interviews, welcomed us and guided us into 'their' makerspaces and wanted to share their own understandings and expectations. If the library makerspace has a future, it will be thanks to the convinced engagement of all the makerspace staff in public libraries in the Netherlands.



ISBN 978-94-6366-147-8