BuildDigiCraft

New Mindset for High-quality Baukultur in Europe:

Bridging Craft and Digital

Annette Bögle, Emiliya Popova (eds.)

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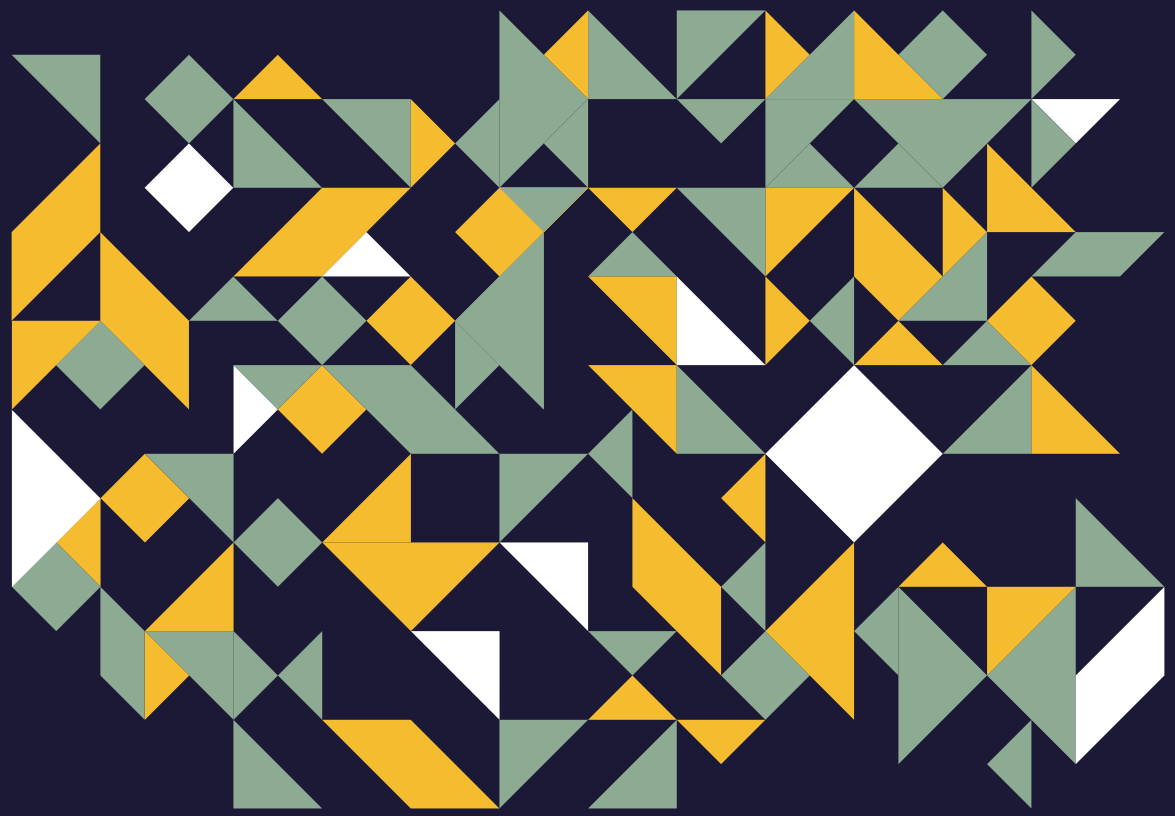
1.0 Introduction



Contents

Authors

Emiliya Popova, Annette Bögle

1.0 Background

[1] **BeInterBaltic**

Full title: Intersections in built environment: promoting interdisciplinary higher education in the Baltic Sea Region

Co-funding: Erasmus+ Strategic Partnerships for Higher Education

Duration: September 2015–August 2018

Motivation — interdisciplinary approach

The BeInterBaltic project focused on the complexity of current urban conditions, actual chances and challenges in the built environment. The traditional division of disciplines is no longer adequate: complexity requires cooperation and understanding between the disciplines of the built environment, especially regarding the design process. However, it is not sufficient only to promote the dialog at the intersections of the disciplines, the impacts on the disciplines themselves must be illuminated, too. For the intersections between architecture and engineering as well as other related disciplines of built environment, this has practical consequences concerning the contents, topics and methods behind the design process.

Baltic International Summer School

Baltic International Summer School (B.I.S.S.)

Within the BeInterBaltic project it was possible to develop and test new teaching methods, formats and instruments in the education of the built environment. This was achieved by the organization, implementation and evaluation of the Baltic International Summer School (B.I.S.S.), which took place in all the three years of the project. The B.I.S.S. brought together more than 60 students from the Baltic Sea region representing various disciplines of built environment and offered them the opportunity to work together in international and interdisciplinary mixed project groups. Input and expert consultations were offered by the involved academic teaching staff, PhD candidates in the role of student group mentors as well as by invited renowned practitioners as keynote speakers. The pilot edition of the B.I.S.S. took place already in 2015 and served as testing ground for the concept outline of the BeInterBaltic project.

- **B.I.S.S. 2015**
  "at — over — on the water"
  Documentation: https://repos.hcu-hamburg.de/handle/hcu/443
- **B.I.S.S. 2016**
  "Hamburg 2030 — Urban Futures"
  Documentation: https://repos.hcu-hamburg.de/handle/hcu/477
- **B.I.S.S. 2017**
  "City Elements — Infrastructure and Networks Shaping Harbor Areas"
  Documentation: https://repos.hcu-hamburg.de/handle/hcu/491
- **B.I.S.S. 2018**
  "Beyond Urban Flows — Architecture and Engineering for Transition Places"

Project aims

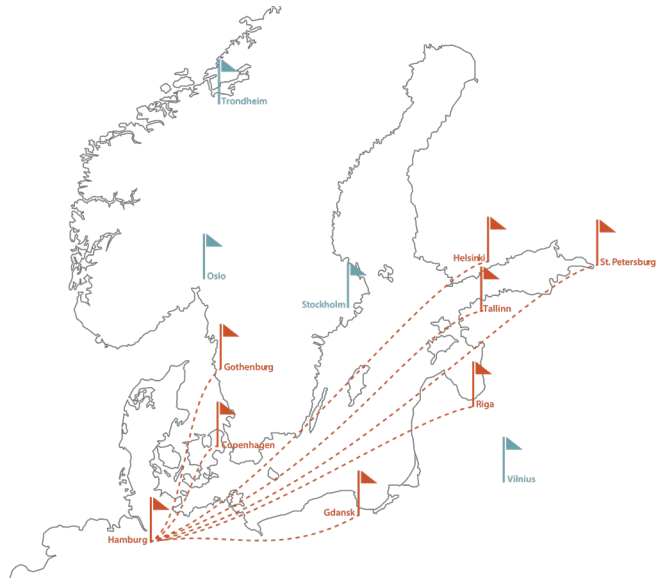
- Develop and test new teaching methods, formats and instruments in the education of built environment
- Adapt current curricula to contemporary and emerging labor market needs
- Equip students with interdisciplinary and intercultural competences and skills needed to deal with complex problems in multicultural societies
- Promote, increase and make full use of the cooperation between the universities across the Baltic Sea region, supporting its sustainable development

BeInterBaltic consortium – Baltic Sea region

- HafenCity University Hamburg, (Lead partner)
- Gdańsk University of Technology
- Tallinn University of Technology
- Royal Danish Academy of Fine Arts
- Technical University of Denmark
- Chalmers University of Technology
- Aalto University

The core of the **BuildDigiCraft** project was the development and implementation of an innovative teaching and training module for young scientists, PhD candidates and advanced Master's level students. It allowed for a joint exploration of the questions of how the ongoing digital revolution is affecting the work of designers, architects, engineers, urban planners and other professionals responsible for the shaping of the built environment and of what new opportunities arise from the available digital and data-processing technologies for creating innovative solutions for the design, construction, maintenance and management of buildings and cities. At the same time the hypothesis was provided that the values and leading principles of traditional craftsmanship, such as dedication, pride in one own's work, and the mindful and sustainable dealing with the building material, need to be re-introduced and validated in the context of the new digitally-driven work environment.

Set in a larger perspective, the training program was part of a long-term cooperation, strategy between eight universities in the Baltic Sea region which in addition to their geographic proximity to the Baltic Sea also share common historic developments, climatic conditions, landscape correlations as well as lots of similarities in the development of handicrafts and the culture of building and construction over the centuries. Despite the similarities, each of these places has its own special and unique character just as each of the represented universities has its own established culture of professional and higher academic education. At an earlier cooperation stage, several years prior to this publication, teachers and research experts from these eight universities were able to exchange initial knowledge and experience on the different teaching approaches, methods and tools used in higher education at their institutes in the disciplines of architecture, structural engineering, urban planning, urban design, environmental engineering as well as art and related artistic studies. This was achieved within the BeInterBaltic project, a forerunner project of the **BuildDigiCraft** project. The **BeInterBaltic** [1] project paved the way for the introduction of a new educational framework to implement joint interdisciplinary teaching workshops between several universities, all situated in cities around the Baltic Sea: Hamburg, Copenhagen, Gothenburg, Gdańsk, Riga, Tallinn and Helsinki. Every year between 2015 and 2018, the ten-day Baltic International Summer School took place in August in Hamburg. Teachers and students from around the Baltic Sea as well as invited experts from across Europe and the rest of the world came together to test and share their knowledge, working methods and latest experience with each other. The educational focus was on the study program of Master's-level students. The supervision of the interdisciplinary and internationally mixed student groups was provided by young scientists and early-stage PhD candidates as well as by regular feedback sessions with senior scientists and guest experts. This first initiative for sharing teaching experience in an interdisciplinary context helped the participating universities to initiate common ground for future interdisciplinary research collaboration. At the same time the need for further development of the joint interdisciplinary teaching formats on a higher doctoral training level was recognized within the cooperation network. **A natural continuation of the Baltic International Summer School on a PhD research level was set as a priority for the future development of the network.**



2.0 Topic and starting point

The introduction of innovative projects for interdisciplinary teaching in the field of the built environment represents the understanding that generally there is a need for more cooperation and understanding between the disciplines of the built environment themselves, such as architecture, structural and civil engineering, urban planning and design as well as artistic and philosophical studies related to space. In the context of the envisaged further research collaboration, the shaping of the built environment is understood within the established network as a collaborative creative process, which aims at improving and further thinking about the social, technical and aesthetic quality of the built urban environment in order to answer the current societal needs by using diverse and interdisciplinarily-oriented methodological approaches.[2]

[2] Interfaces in the Built Environment. Bridging Technology and Culture in the Baltic Sea Region (Proceedings PhD Symposium), file:///C:/Users/hhz856/Downloads/PhD_Proceedings_Interfaces_final.pdf https://repos.hcu-hamburg.de/handle/hcu/500

As in any interdisciplinary context, the main challenge in bringing together so many different academic and disciplinary as well as professional and cultural backgrounds and experiences was the setting up of a common framework for knowledge integration. It was important that this would allow for different topics, methodologies, design principles and theories as well as for the different scales of the built environment – from the structural and architectural detail through the building to the urban level – to find common ground to mutually benefit each other.

In the concept phase of the **BuildDigiCraft** project, a natural continuation of the BeInterBaltic project, the main challenge was to identify the shared goal and the means for its final achievement. The main questions were: what is the future built environment that we would like to frame together, and what binds us all together?

The group gravitated toward the idea – simple as it may sound – that ideally in every piece of work that designers, engineers and planners create, there should always be an inner striving to achieve higher quality in the surrounding built and natural environment. But then the question arises as to what it is that the high quality of the built environment is comprised of. And how do we measure the perception of this quality? In 2018, the same question gained importance and was introduced for discussion on a higher political level in Europe. In January 2018 the European Ministers of Culture came together for **the Davos Conference on High-quality Baukultur in Europe**. It was agreed that the overall concept of high-quality Baukultur should be embedded in Europe on a political and strategic level. Baukultur is understood within the context of the Davos Declaration through the following three central aspects:

[3] Davos Declaration, 2018, https://baukultur--production--storage.s3.amazonaws.com/baukultur/2022-06-09-075742--context-document-en.pdf

1. The existing construction, including cultural heritage assets, and contemporary creation must be understood as a single entity. The existing construction provides an important Baukultur reference for the future design of our built environment.
2. All activities with an impact on the built environment, from detailed craftsmanship to the planning and execution of infrastructure projects that have an impact on the landscape, are expressions of Baukultur.
3. Baukultur not only refers to the built environment but also to the processes involved in its creation.[3]

Most importantly, a new term in the professional language of the specialists of the built environment was put forward on an official political level – the German term Baukultur was introduced to underpin the understanding that the built environment is not only the collection of the existing and contemporary building stock and infrastructure, but also involves all the processes and activities required for its creation. Based on such an understanding, the Davos Declaration gives further incentives to society, politics and science to rethink the current situation which is marked through disciplinary blinkers, ephemeral profit maximization or digital automation, as well as confronted by major ecological and climatic challenges putting at risk the future of our planet.

Baukultur encompasses all activities with spatial impact, from craftsmanship details to large-scale urban planning and development of landscapes. Baukultur refers to all activities with spatial impact of all actors involved over time.[4]

[4] The Davos Baukultur Quality Assessment System. Davos Declaration: Towards a High-quality Baukultur for Europe, 2018.

Next to the term Baukultur, the Davos Declaration has inspired the development of clearly defined criteria for the definition of a high-quality Baukultur. The **Davos Baukultur**

Quality System consists of eight major criteria that help to define the high-quality Baukultur level of places. These are Governance, Functionality, Environment, Economy, Diversity, Context, Sense of Place, and Beauty (Fig[●1]).

The concept of high-quality Baukultur is essential for the formulation of the aim of the **BuildDigiCraft** project. It offers a holistic framework for bringing together a wide range of diverse research topics and methodological approaches related to future shaping of the built environment. Two years after the Davos Declaration, in 2020, another major political initiative within the European Union built on the concept of Baukultur and the **Davos Declaration** from 2018 – the **New European Bauhaus (NEB)**. NEB calls for the formation of a new movement of citizens, experts, designers, professionals, businesses, and institutions engaged in the shaping of the built environment. It advocates a joint reimagination of "sustainable living in Europe and beyond,"[5] including the creation of a common platform for experimentation and connection leading to the realization of more beautiful, sustainable and inclusive projects. With the Davos Declaration 2018 and the NEB Initiative, two major political milestones, a very clear message was sent throughout Europe – an open invitation to reflect together on the need for a crucial change in the mindset of the professionals responsible for the built environment as well as of society as a whole and to look at how we want to address and shape the built environment of the future in the context of global societal and climatic challenges.

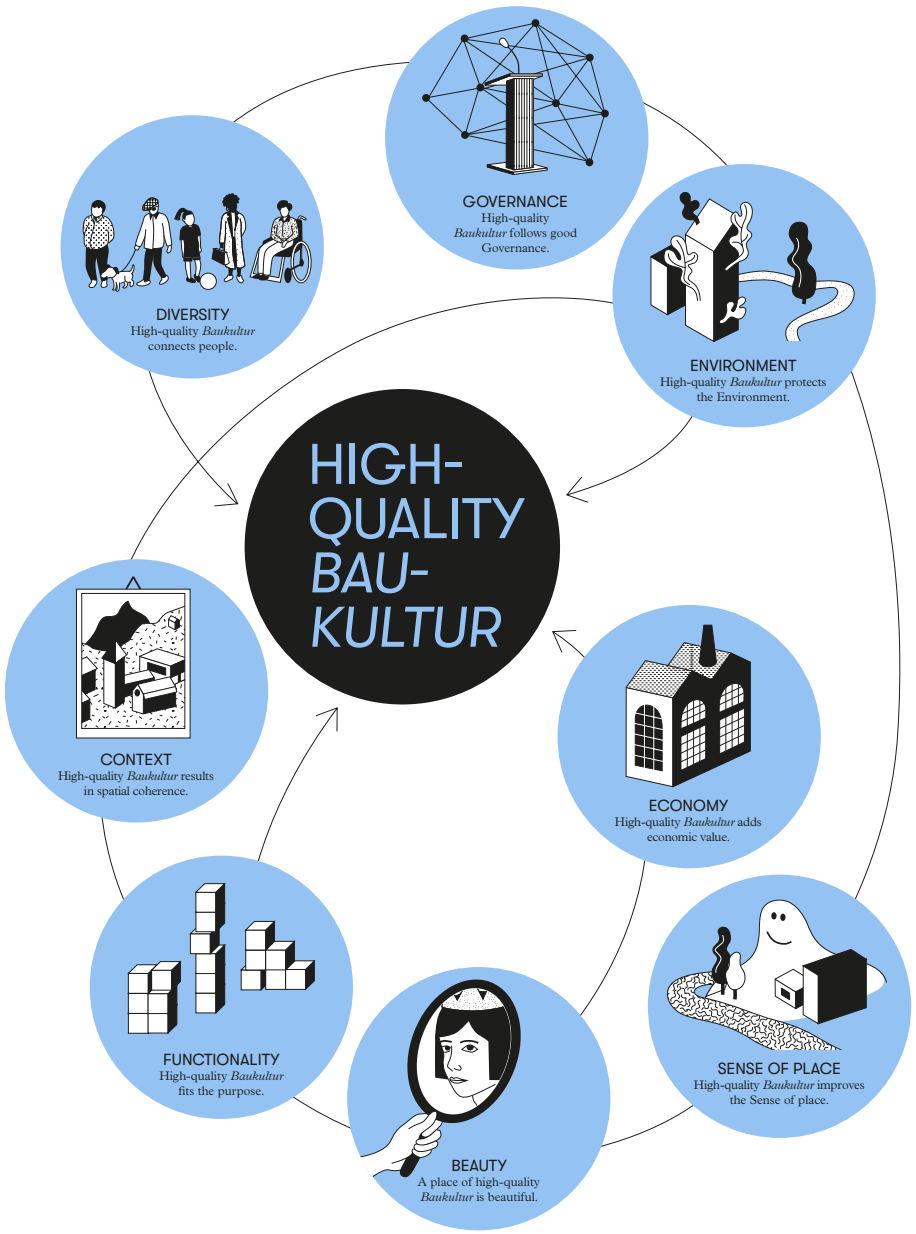


Fig [●1] Eight criteria for a high-quality Baukultur — the Davos Baukultur Quality System
© Swiss Federal Office of Culture / Illustration: Heyday

5 New European Bauhaus Initiative, main web page, https://new-european-bauhaus.europa.eu/about/about-initiative_en

The building and construction sectors are known for being **very conservative when it comes to risks and changes**, and at the same time not flexible enough to manage to adapt quickly to the changed circumstances. Therefore, it is not surprising that exactly this sector meets most challenges in its reorganization and reaction to current climatic, societal and technological challenges. There is **an urgent need for a change of mindset** in the design and management approach of the issues of the built environment.

One of the main outcomes of the BeInterBaltic project and the Baltic International Summer School was the recognition that **interdisciplinary teaching and research in the disciplines of the built environment use new digital tools as a common language**. Current advancements in information technology such as the use of AI and machine-learning algorithms, online real-time networked platforms, parametric design, BIM and GIS applications, VR and AR technologies as well as the use of new digital

manufacturing technologies for rapid prototyping, digital fabrication and generative component design have already entered the professional and educational field of architects, structural and civil engineers, urban planners and product designers. Students and young researchers use the advantages of these technologies in their projects and practice and are not afraid to test them in the context of new design and planning tasks. While there is an open-minded and predominantly advantage-oriented approach toward the use of new technologies by the young generation, this is still not generally the case among professionals in the planning and construction industry. This industry sector still struggles to adapt its rules and regulations as well as its business policies and logic to the ongoing digitally-driven transformation. **There is a need for a fundamental change in the way "we are doing things" and the way "we communicate and collaborate with each other" and digital technologies play a major role in this transformation process**. This refers not only to the field of the built environment but to almost every field of occupation.

Next to the numerous opportunities arising from the new technological approaches available for data leverage, processing and monitoring, there are also **a lot of uncertainties and fundamental fears to be observed in society**. First of all, there is the fear of the ability to adapt to the new working conditions and the fear of losing jobs. A large number of society members do not feel prepared for the new market requirements. Besides that, there is a general distrust towards the reliability of digital infrastructures as well as toward data privacy policies regarding the collection, storage and processing of vulnerable personal data. Another major uncertainty regarding the integration of purely digitally-driven work processes refers to the achieved quality of the final product (services or goods) and the ability of these processes to serve individual or specific boundary conditions. This brings along the fear of overdone standardization and simplification, which is seen as a major issue in the for the built environment so relevant field of design and aesthetics.

In searching for an answer on how we can overcome these deeply anchored fears and uncertainties in both society and among professionals when it comes to solving questions related to the way we shape and maintain the built environment, the **BuildDigiCraft** network recognized the importance of **highlighting the values and knowledge of traditional craftsmanship accumulated** over the centuries. Craftsmanship addresses in its essence quality, beauty and resource efficiency; it promotes a relation to sustainable material and techniques and offers tangible experiences through synergies of mind and hand while intimating satisfaction in achieving a level of mastery and highest quality. Craft entails implicit and tacit knowledge and is passed on between craftspeople. Craft values are deeply sustainable as their core value is quality and reducing wasteful approaches. The craftsmanship ethos in design and building projects is essential for strengthening the sense of belonging and commitment to the surrounding space because it gives meaning to the process and because through craftsmanship the process can be identified with the material and the physical outcome of the project.

Considered in the context of the **BuildDigiCraft** network, handicraft traditions and craftsmanship knowledge in the Baltic Sea region were already acknowledged early on as a common factor in the development and realization of building projects throughout the region. The professional guilds of craftspeople in the Hanseatic and Nordic cities around the Baltic Sea have exchanged skills and knowledge throughout the centuries mainly thanks to the short maritime distances and established commercial relations. Today, this is still valid, and this exchange holds not only for the Baltic countries but for almost every region populated by humans on earth. Identifying and introducing **craftsmanship as a main guiding principle in the context of the ongoing digital transformation of the design and construction sector** was therefore essential for setting up the framework for designing a new path leading to a high-quality Baukultur in the digital age.

3.0 Motivation and mission

BuildDigiCraft builds on the holistic concept of Baukultur and seeks to explore opportunities to further develop it in the context of a highly-digitalized world.

The German Federal Foundation Baukultur gives the following definition for Baukultur:

*"Baukultur aims at good planning and building. It combines a **high design standard** with a **holistic view of social, economic,** and **environmental aspects,** and thus has an **emotional and aesthetic dimension.** Baukultur is essential to produce an environment that is perceived as **liveable.** It serves to secure and develop the **social and economic values** thus created. Producing Baukultur is **a social process** based on a broad understanding of **qualitative values and goals** and their implementation with high levels of **interdisciplinary expertise.** Baukultur is the **positive result of a good process culture.**"* [6]

One of the main current challenges identified by the Federal Foundation Baukultur is the changing values and technical innovation regarding the question of how we will live in future.

BuildDigiCraft aims to embrace the huge opportunities arising from digitalization while at the same time reconnect the actors (e.g., designers, builders, and users) and the projects (e.g., the built environment) with the work qualities of craftsmanship.

The mission of **BuildDigiCraft** is:

- to raise awareness on the overreaching concept of Baukultur
- to raise awareness on the need of cultural change in the building sector through digital advancements in technology and science
- to bring in the qualities of craftsmanship in a digitally-driven environment

6 German Federal Foundation Baukultur (Bundesstiftung Baukultur), BAUKULTUR REPORT "Built Living Spaces of the Future – Focus City" 2014/15, English version, https://www.bundesstiftung-baukultur.de/fileadmin/files/medien/78/downloads/baukultur-bericht-e.pdf

4.0 Aims

The main aim of the **BuildDigiCraft** project is to establish a European training network for young researchers, teachers and practitioners that promotes **innovative teaching approaches** for shaping the built environment based on the imminent and highly necessary culture change in the building sector caused by the rapid advances of digitalization.

The BuildDigiCraft project deconstructs Baukultur down to its core elements, i.e., Processes, Knowledge, and Material (Fig[● 2]). Shaping and maintaining of the built environment results in complex and diverse processes and includes design, planning, construction, maintenance, and as well as end of use phase. In broader terms, these Processes are influenced by the available Knowledge and understanding of Material. The **values, skills and tools** serve to actuate the developments and to carry out the Process.

The project raises awareness on the current relevance of the topic regarding the ongoing cultural transformation in the building and planning sector. With the introduction of the **BuildDigiCraft** model for scientific reflection, a holistic framework for interdisciplinary exchange is offered to a broader research community. Within the training program participants are equipped with new skills and competences, which help them to prepare for the future labor market requirements.

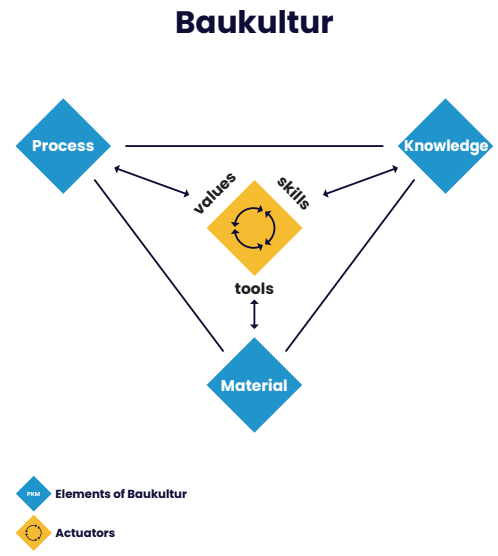


Fig [● 2] **BuildDigiCraft** model for scientific reflection.

5.0 Concept and method

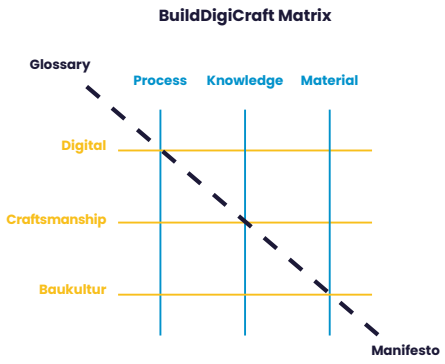


Fig [●3] Matrix-based conceptual and methodological approach of the training program.

The conceptual and methodological approach of the training program is framed within the matrix-based intersection of the pillar concepts of the **BuildDigiCraft** project. The three major thematic concepts Baukultur, Craftsmanship and Digitalization are aligned on the vertical axis; horizontally, they intersect with the three constructive elements of Baukultur: Process, Knowledge, and Material. This grid is the foundational framework for the directions that are explored within the training program.

As in every interdisciplinarily run project, at the beginning there is a need to identify and contextualize the language used, the methods, and the boundary objects to thereby enable a better understanding among the participants of the training network. This usually requires the introduction of a project-based or context-oriented glossary. Next to the standard understanding of a glossary, which usually offers definitions of jointly used terminology, the **BuildDigiCraft** introduces an extended version of the standard glossary concept. The Glossary in the **BuildDigiCraft** training program is understood much more as a method for contextual reflection on the used terminology than simply offering static definitions. It allows for a temporal as well as scale-oriented exploration of the terms used in the project concepts and ideas (see Fig[●3]). The **BuildDigiCraft** Glossary thus helps build a common foundation for shared understanding of the main concepts in the project as well as of the context-specific input shared by the training participants. The Glossary plays an essential role in the development of the methodological approach of the training program because it is used as a method for reflection on complex research questions. The **BuildDigiCraft** explorative matrix as well as the complementary Glossary methodology help develop the content of the intellectual outputs of both the project and the training program. Within a final, post-training reflection phase about the program, the essence and major statements of the project are brought together in a **BuildDigiCraft** Manifesto, which, unlike the Glossary, offers precisely defined statements and recommendations for the role of higher education training for the formation of a new professional mindset leading to high-quality Baukultur in the digital age.

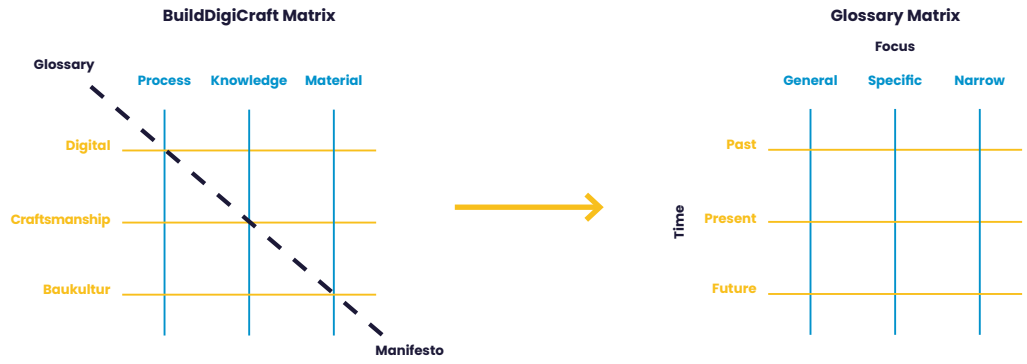


Fig [●4] Matrix-based method for contextual reflection on the used terminology: vertically temporal and horizontally scale-oriented exploration.

Structurally, the training program is one of the main working packages within the **BuildDigiCraft** project. It is the backbone of the whole project, offering a well-framed platform for an extensive intellectual discourse between all project participants: advanced Master's-level students, early stage researchers and experienced scientists. The material generated within the **BuildDigiCraft** training program was evaluated as research material within the rest of the working packages, which at the same time corresponds to the intellectual outputs of the project.

Working package	→	**Intellectual output**
WP1: Glossary	→	Glossary as a method for reflection on complex research questions
WP2: Process	→	Guidelines for a design process leading to a high-quality Baukultur in the digital age
WP3: Knowledge	→	Toward guidelines for the development of a higher education curriculum: bridging craft and digital for a high-quality Baukultur
WP4: Material	→	The meaning of Material, Materiality, and the Digital for Baukultur
WP5: Manifesto	→	Manifesto for High-Quality Baukultur in the Digital Age
WP6: New teaching and training module	→	Interdisciplinary Doctoral Training Course
WP7: Digital platform	→	Digital exhibition space and cloud-based exchange platform