Output O5

Digital training for the construction and finishing trades

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Project Partner

Hanse-Parlament, Germany (Lead Partner)

Hochschule 21 gemeinnützige GmbH, Germany

Handwerkskammer Schwerin, Germany

Satakunta University of Applied Sciences, Finland

Latvian Chamber of Commerce and Industry, Latvia

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Hungarian Association of Craftsmen Corporation, Hungary

Informatikai Tavkozlesi Elektronikai Vallalalkozasok Szovetsege Egyesulet, Hungary

Language[1]

English

Contents

[1] The official examination regulations are available in German and English.

1. Introduction

Project Summary

Small and medium-sized enterprises (SMEs) in the construction sector urgently need to overcome the following challenges:

a) Fast, active and efficient shaping of the digital transformation.

b) Comprehensive realization of cooperation across different organizations at all stages of the construction process.

c) Attracting the urgently needed, appropriately qualified next generation of skilled workers and entrepreneurs.

The demand for good apartments and houses has rarely been as high as it is now, and yet there is far too little affordable housing available. Hence, significant increases in efficiency and acceleration of construction planning and execution are much needed in the construction industry. Construction projects can be carried out more efficiently through the application of targeted digital tools. In fact, around 30% of planning capacities can be saved this way. In addition, digital technologies make the identification of risks in the construction possible at an early stage so that they can be avoided.

When building one- and two-family houses, up to 25% of the total construction costs go to coordination work, which can be reduced to a very large extent through self-coordination using digital tools. Since the construction industry is characterized by a highly specialized division of labor, coordination errors can quickly occur, which often result in inferior quality and delays. Furthermore, energy and environmental aspects are often not given enough attention during new constructions and reconstructions. With the help of digital technologies, building owners, architects, engineers and craftsmen can plan together easily, increase the quality and ensure the adherence to deadlines. Moreover, new technologies make it possible to determine the energy costs of a building at an early stage and to eliminate risks or hidden costs. Individual priorities can be placed on technical features or environmental aspects. Although digital technologies and tools are already being tested and used in practice, the overall digitalization in the construction sector is only advancing very slowly.

Compared to other countries (e.g. the Netherlands, Denmark or Finland), Germany has a lot of catching up to do. SMEs in the construction and finishing trades, which are very active in the construction of one, two and smaller multi-family houses are particularly hesitant when it comes to using new digital tools and are therefore the focus of the project. The shortage of skilled workers is particularly severe in the construction industry.

The attractiveness for vocational training and construction activities is clearly suffering from the high specialization, physically difficult work, heteronomy, etc. The targeted use of digital technologies can reverse these barriers and lead to decisive increases in attractiveness. Large companies and general contractors in the construction industry often use their own digital systems, which they impose on their SME subcontractors, making them dependent and completely transparent. This leads to the rejection of digitalization in SMEs. There is a lack of SME specific advisory and training programs on digitalization in the construction and finishing trades. Both the owners and the employees of the SMEs have a high need for information, advice and further training. Support capacities must be expanded, and teachers and consultants of SMEs

must be prepared and trained in a targeted manner in order to be able to convey SMEs and their employees the use of digital technologies. The SME-specific training courses should highlight the intersections and interdependencies between the various trades and actors through transparent interfaces, in order to promote the need for cooperation and the use of digital technologies.

The overall objectives of the project are:

1. To quickly and productively shape the digital transformation in small and medium-sized enterprises (SMEs) in the construction sector based on the needs and challenges they are facing, so that as many SMEs as possible use digital technologies and tools in all fields of activity in their company.

2. To facilitate easier cooperation through digital technologies between all those involved in the construction work (clients, architects, engineers and SMEs in the various trades) from planning to the execution, including the management of the construction of large-scale projects.

3. To increase the efficiency, quality and punctuality in the construction industry as well as the ability to include environmental and sustainability aspects in the planning, construction or renovation of buildings through the application of specific digital tools and technologies.

4. To increase the attractiveness of vocational training and work in the construction sector in order to meet the already very high and still growing demand for qualified skilled workers and entrepreneurs in this sector. In order to achieve these decisive objectives, the following action goals are pursued in the project.

a) Providing digital technologies and tools as well as cooperation methods suitable for SMEs in the construction industry by analyzing international best practices and adapting them to the different national conditions, which are then transferred to SMEs together with individual implementation advice.

b) Providing SME specific education programs on digital competences and skills by analyzing and adapting international best practices, which are then implemented by chambers with their educational institutions, vocational schools and other VET institutions.

c) Strengthening the educational and counselling capacities as well as the qualification of teachers and consultants of SMEs so that they can give sound advice on digital transformation and implement qualification programs.

d) Increasing the attractiveness of vocational training and winning qualified young people with strong learning ability for the construction sector by developing, testing, evaluating and implementing additional qualification trainings on digitalization in the construction sector, which are completed during or directly after vocational training and result in an independent, recognized vocational qualification.

e) Enabling architects, engineers and SMEs in the construction and finishing trades to realize comprehensive collaborations through the use of digital technologies by developing, testing, evaluating and implementing a training program on collaboration management and digital skills.

f) Enabling SMEs and their employees to make full use of digital technologies in all areas of construction by developing, testing, evaluating and implementing a training program on digital competences and skills.

g) Contributing to closing the entrepreneurship gap by attracting young entrepreneurs with digital competences and skills through the development, testing, evaluation and implementation of a module program for digital entrepreneurship training.

h) Increasing the attractiveness of vocational training and work in the construction sector by offering interesting, expanded areas of activities as well as qualifications with recognized degrees at all levels of vocational training with maximum permeability.

i) Strong regional dissemination of the implementations of the project results by transferring the results and demand-oriented implementation recommendations to 72 SMEs and education institutions from 13 countries.

About the digital training for the construction and finishing trades

Through the extensive use of digital technologies, cost savings, quality increases and adherence to dead-lines are achieved in residential construction. To promote this, a concept, curriculum and teaching materials were developed on digital training for the construction and finishing trades as well as an SME-specific program for the implementation of training and coaching. The developed programmes were tested in live operation under various national conditions, evaluated and finalised on the basis of the evaluation results. The target groups are entrepreneurs, managers and specialists in the construction industry, who can acquire a recognised continuing education and further training qualification by completing the training.

Output O5 includes:

- Concept, curricula and teaching materials for the training of SME managers and, in particular, specialists in the construction and finishing trades for the use of digital technologies in all construction tasks.
- Program for the implementation of training and coaching
- Official examination regulation
- Implementation Reports
- Evaluation Concept and Report

2. Curriculum for digital training for the construction and finishing trades [2]

The education program

This course, based on the results of R1 "Best Practices digital technologies and trainings" is further training. The education program, which fully complies with the EU Action Plan for digital education, builds on the European Digital Competence Framework (DIG COMP). The overall program consists of several modules that correspond to the DIG COMP structure and are assigned to levels 4 - 6. are assigned. The curricula are developed according to learning outcomes, which are classified in levels 5 of the EQF.

The training program consists of the following elements:

a) Several (at least two) blocks in the educational institution.
b) Between the blocks phases of learning on the job in the SME.
c) Process of introduction and use of digital tool, in which SME in the phases of learning on the job, so that as many as possible in the workplace learning phases, so that as many employees are involved in the change, learning and implementation processes.
d) Program for coaching by the instructors and advisors of the Chambers during the workplace learning phases and. the introduction of digital technologies. As part of the education and Coaching program, best practice tools, methods, approaches, etc. (see Result 1) are taught and their application trained.

The main effects are:

a) SMEs and their employees are comprehensively qualified to cope with the digital transformation and benefit digital technologies for their various fields of work.
b) Training institutions and SME sponsors receive a training and proven training and coaching program that is used on a broad regional basis.
c) Realized are efficiency and the attractiveness of the construction industry.

The result is transferable without restriction.

The aim is to give knowledge and skills to use modern digital tools and to motivate participants to listen also those opposing the planned projects or projects that are already under construction. During the course, some examples of usable tools will be presented and couple of these will be used, and practical examples their impacts will be presented.

The course will be based to the KAIN-method (Knowledge Acquisition according to Individual Needs). The aim of the KAIN-method is to create a common knowledge base for participants with different backgrounds by utilizing the individual experiences and knowledge of participants. The method shows opportunities to change or improve the situation of the participants and to change ways to gain project goals. It also sharpens the awareness of possible needs for change, and

[2] Compiled by Tamas Ferenczi (M.Sc.) and Andreas D. Weise (Prof. Dr.), Buxtehude University of Applied Sciences, Germany

enables the involved participants to find, define and design the right tools and implement them correctly.

Target groups

Target groups are owners and of SMEs in the construction and finishing trades who require receive comprehensive training to help them master the digital transformation and already start using digital technologies during with the use of digital technologies.

Methodology

The course is based to the KAIN-Model. During the course, following methods can be used (the list is not final nor excluding other teaching methods):

- Classroom lectures
- Online learning
- Self-learning as a part of project work.
- Individual project
- Online discussions
- Class room discussions
- Assignments
- Reports and presentations including self-reflection

With the help of following tools (the list is not final nor excluding other didactic tools):

- PowerPoint or other presentation tools
- Online learning platforms (e.g. Moodle)
- Online collaboration tools (e.g. Padlet)
- Online presentation tools (e.g., Prezi)
- Word Cloud tools (e.g.
- Videos
- Articles and other online material

The content of the training

Phase 1 - Educational block A

The education program fully complies with the EU Action Plan for digital education and builds on the European Digital Competence Framework (DIG COMP).

The first day deals with basic and fundamental issues of digital working processes in the construction and finishing trades. Motivations, goals, advantages and disadvantages will be presented. These points and concerns and other aspects should be also interactively discussed with the participants, and a brief presentation of KAIN-method, should be included into this day.

The second day deals with the question: “How can general working processes supported by digital tools?” Basic and fundamental digital technologies for working processes will be presented and learned. An overview about UpToDate digital tools for working processes in the construction and finishing trades will be presented, and several case studies in which digital tools were applied and working processes and projects were realized fully by digital tools. Experiences

and lessons learned should be exchanged and discussed. One or more of the presented tools will be used during the whole course.

In the end of the second day, the instructions for the next phase – learning on the job – will be given. One or more digital tools for general working processes in the company (SME) should be chosen and applied in the SME during the Phase B (Learning on the Job).

Phase 2 - Learning on the job A

In this phase one or more digital tools for general working processes in the company (SME) should be chosen and be realized in the enterprise of construction and finishing trade.

The working processes should be connected with the topics of Phase 1 - Educational Block A. For the working processes, tools presented in the earlier phase should be used both in solving the problems risen during the project and in searching information concerning the optional learning tasks. Time to be reserved for this self-learning and implementation process should be long enough but not too long. Recommended period is about 8-12 weeks.

The introduction of digital technologies and the phase of workplace learning will be supported by a coaching program by the instructors and advisors of the Chambers. As part of the education and coaching program best practice tools, methods and approaches etc. are taught and their application trained.

Phase 3 - Educational block B

This day deals with the question: “And how can specified working processes carried out in fully digital way?”

Digital technologies for specified working processes will be presented and learned. An overview about UpToDate specific digital tools for working processes in the construction and finishing trades will be presented, and several case studies in which these digital tools were applied and working processes and projects were realized fully by digital tools. E.g. digital defect management, applying drones or robots on the construction site, 3D Printing, applying apps on the construction site etc. Experiences and lessons learned should be exchanged and discussed. One or more of the presented tools will be used during the whole course.

In the end of this day, the instructions for the next phase – learning on the job – will be given. One or more digital tools for specific working processes in the company (SME) should be chosen and applied in the SME during the Phase C (Learning on the Job).

Phase 4 - Learning on the Job B

In this phase one or more digital tools for specific working processes in the company (SME) should be chosen and be realized in the enterprise of construction and finishing trade. . E.g. digital defect management, applying drones or robots on the construction site, 3D Printing, applying apps on the construction site etc.

The working processes should be connected to the topics of Phase 3 - Educational Block B. For the working processes, tools presented in the earlier phase should be used both in solving the problems risen during the project and in searching information concerning the optional learning

tasks. Time to be reserved for this self-learning and implementation process in should be long enough but not too long. Recommended period is about 8-12 weeks.

The introduction of digital technologies and the phase of workplace learning will be supported by a coaching program by the instructors and advisors of the Chambers. As part of the education and coaching program best practice tools, methods and approaches etc. are taught and their application trained.

Phase 5 - Reporting Day

The aim of this day is to present experiences and results of digital working processes realized in the SME. Applied and realized digital processes will be presented to each other, knowledge and experiences and lessons learned will be exchanged, further steps will be discussed.

In addition to these, a concluding lection summarizes the lessons gained during the this further training.

The KAIN Method emphasizes the role of self-learning. The time reserved for lectures is relatively small, thus in the lectures, only essential issues should be dealt with. However, KAIN enables the use of self-learning tasks, and teachers are encouraged to use these to show the participants how information can be acquired by themselves. However, if the self-learning tasks are used, it is important to teach participants how to find and recognize reliable and relevant information, and how to distinguish between information and disinformation, and between relevant and irrelevant information.

Schedule of the further training

Phase 1 - Educational block A (2 days, 2 x 8 h)

- Day 1, 8 h
  - Introduction and motivation
  - European wide legislation, country-specific and local regulation
  - These points and concerns and other aspects of digital change should be also interactively discussed
  - brief presentation of KAIN-method
- Day 2, 8 h
  - Examples of tools + testing certain tools
  - Basic and fundamental digital technologies for working processes
  - UpToDate digital tools introduction
  - Several case studies
  - Introduction to "Learning on the job"

Phase 2 - Learning on the job A (8-12 weeks)

- Digital tools for general working processes in the company (SME) are to be realized
- Tasks and Assignments
- Coaching Program

Phase 3 - Educational block B (1 day, 8 h)

- Examples of tools + testing certain tools
- Specific digital technologies for specific working tools
- several case studies
- further steps in "Learning on the job"

Phase 4 - Learning on the job B (8-12 weeks)

- digital tools for specific working processes in the company (SME) are to be realized
- Tasks and Assignments
- Coaching Program

Phase 5: Reporting Day (1 day, 8 h)

- sharing, exchanging experiences, lessons learned
- reporting successful imlementation of digital tools
- discussion about further steps
- summerizing lection

1/2-year-programm for realizing digital tools

Figure 1. Elements of the further training

Qualification requirements

After the course, a participating company should ...

- understand why the digitalization of working processes are important;
- know, how the digital tools can be used
- be able to implement and realize working processes in a digital way.
- be able to use some of the digital tools;
- realize both the power, opportunities and risks of digital tools in working processes;
- be aware of the risks connected to the use of digital tools, and should know, how to protect against these.

The gained skills will be proved by successful application and implementation of digital tools for working processes.

Because the course is further training, each facilitator should define the final qualification requirements in accordance with local regulation, and rules of their own institute, considering the requirements and wishes of employers.

APPENDIX A: Example of the course content and schedule

Phase 1	**Topics**	**Material examples and Notes**

Educational Block - Day one
8 hours, including short breaks and lunch pause
	Introduction and motivation, 2 hours
	- Introduction to KAIN-method
	- Digital tools & processes: What and why
	- Highlights the role of digitalization in companies
	  ○ New tools and renewed needs
	  ○ New concepts of working processes
	- Advantages offered by this development
	- Despite of the huge advantages, the risks must be known too.	

	European wide legislation, country-specific and local regulation, 30 minutes - This part should be localized according to policy and legislation in each country	
	Lunch pause according to local regulations	
	Ways of digital change in companies, status quo, future perspectives, effectiveness	NOTE: Several cases of best practice collection can be

		presented here as examples of different approaches.
	Discussion of concerns and other aspects of digital change in small groups. Exchange discussion results	
	Problem solving, tools and tips - Different problem-solving styles	

Phase 1	**Topics**	**Material examples and Notes**
Educational Block A - Day two 8 hours, including short breaks and lunch pause	Examples of tools + testing certain tools, 3 hours - Practicing and testing free versions of certain tools, see examples right. Time for testing should be reserved at least 45 minutes per tool. Before the test, a brief presentation of tool is recommended.	Digital technologies for working processes examples: Digital Calculation Tools e.g. Excel OneDrive BIM 2D-3D design Ortograph Artesa Handwerk Planer Archline XP QElectroTech
	Lunch pause	
	Case Studies	NOTE: it is recommended that local experts are used as visiting lecturers.
	Discussion	
	Instructions and tasks for the working on the job phase, 1 – 2 hours depending on the number of participants. - Information and instructions concerning the project phase, e.g., ○ How to choose a tool ○ How to implement and run a tool ○ How, when and whom ask for help ○ Contact information of available tutors / trainers ○ How to write a report and presentation - Learning tasks – if used	

	○ Tasks, deadline, tips for solving, how to return the answer Every participant should be given an opportunity to ask questions	
	Coaching Program, opportunities, chances	

Phase 2	Topics	Material examples and Notes
Learning on the job phase A 8 - 12 weeks	Learning on the job - Work place learning - Trainee should implement a digital tool for working process at his / her workplace. Goal of the job phase should be connected with the topics of the course	NOTE: Teacher / Trainer / Coach should be easily available and contactable during the whole period.
	Learning tasks and assignments - Optional - Suitable in cases where e.g., employers expect that a trainee gets or improves certain special skills. - Task and / or assignments should be given in a way that enables a trainee to solve them independently, knowing, that help is available if needed. NOTE: Tasks and assignments should be planned case by case depending to the needs of the trainees and goals of the training.	

Phase 3	Topics	Material examples and Notes
Educational block B - 8 hours, including short breaks and lunch pause	Examples of specific digital tools for construction and finishing trade + testing certain tools, 3 hours Practicing and testing free versions of certain tools, see examples right. Time for testing should be reserved at least 45 minutes per tool. Before the test, a brief presentation of tool is recommended.	Digital technologies for working processes examples: 123Onsite CAPMO Planradar iFresco
	Lunch pause	
	Case Studies	NOTE: it is recommended that local experts are used as visiting lecturers.
	Discussion	
	Instructions and tasks for the working on the job phase, 1 – 2 hours depending on the number of participants.	

	- Information and instructions concerning the project phase, e.g.,
	  ○ How to choose a tool
	  ○ How to implement and run a tool
	  ○ How, when and who ask for help
	  ○ Contact information of available tutors / trainers
	  ○ How to write a report and presentation
	- Learning tasks – if used
	  ○ Tasks, deadline, tips for solving, how to return the answer
	Every participant should be given an opportunity to ask questions	

	Coaching Program lesson learned, opportunities	

Phase 4	**Topics**	**Material examples and Notes**
Learning on the job phase B 8 - 12 weeks	Learning on the job - Work place learning - Trainee should implement a digital tool for a specific process at his / her workplace. Goal of the job phase should be connected with the topics of the course	NOTE: Teacher / Trainer / Coach should be easily available and contactable during the whole period.
	Learning tasks and assignments - Optional - Suitable in cases where e.g., employers expect that a trainee gets or improves certain special skills. - Task and / or assignments should be given in a way that enables a trainee to solve them independently, knowing, that help is available if needed. NOTE: Tasks and assignments should be planned case by case depending to the needs of the trainees and goals of the training.	

Phase 5	Topics	Material examples and Notes
Reporting Day - 1 day, 8 hours, including short breaks and lunch pause	Project reports - Trainees presents the brief reports on their "working on the job" phases and assignments - Discussion	
	Concluding lecture - summarizes the course	

Links for inspiration

Further Training

About Kain Method
https://re-grow.eu/wp-content/uploads/2023/05/KAIN-Method-Continuing-education-program-for-SME-executives-and-HR-experts.pdf

About Training & Mentoring in Kain Method
https://re-grow.eu/wp-content/uploads/2023/05/KAIN-Method-Mentoring-Training-English.pdf

Conference Papers

International Conference on Computer-Aided Architectural Design Research
https://papers.cumincad.org/data/works/att/2017_CAADRIA-2017_k.pdf

Tools for digital working Processes in the finishing trade

Digitization in practice (DE)
https://drive.google.com/file/d/1-eaM175wUBGbKrM_DNkQ4rcuO_cyitnq/view?usp=sharing

Construction and Project Management Optimization (CAPMO)
https://drive.google.com/file/d/1-ion8kp6VexQfNs6BmBYAc3yZYj4CRAT/view?usp=sharing

Paperless construction site
https://drive.google.com/file/d/1-rHBejw2vhJP8jO6aiHrh857zn3A-AyY/view?usp=sharing

Digital defect Management
https://drive.google.com/file/d/1-qGwN8tYjJQUhNBFDuQcwRxPh4qgBefR/view?usp=sharing

Digital documentation on construction site
https://drive.google.com/file/d/1-vEOZCJ4ypTpg5u8KZfDIT7GUT0O4llh/view?usp=sharing

Digital solutions in the finishing trade
https://drive.google.com/file/d/1-nN-VoQkYP5eGfPFZe5gLvFasCN6H3DN/view?usp=sharing

Applying construction software for working processes
https://drive.google.com/file/d/10HKYIO8RHkvjfc5b1OwUa01YyywHy2a8/view?usp=sharing

Change-Management
https://drive.google.com/file/d/10JkOer_j636usDcP_GudqlQcVZYU_NMp/view?usp=sharing

Standardization & digitization of building processes
https://drive.google.com/file/d/10SZAYCJGYs9CGr2G7BSdnurqLbhjJ25G/view?usp=sharing

Digital Lean Construction Management
https://drive.google.com/file/d/10WXvbhU1JTN3Z49ELm2sd3pDzayw4wyF/view?usp=sharing

How artificial intelligence will soon (and should) get involved on your construction site
https://123erfasst-de.translate.goog/ki-bauwesen/?_x_tr_sl=de&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

Funding programs for digitization
https://123erfasst-de.translate.goog/foerdermassnahmen-digitalisierung/?_x_tr_sl=de&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

Digitization opens up new opportunities for craft businesses
https://123erfasst-de.translate.goog/digitalisierung-im-handwerk/?_x_tr_sl=de&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

The typical digitization hurdles
https://123erfasst-de.translate.goog/digitalisierungshuerden-was-tun/?_x_tr_sl=de&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

How to choose, analyze and evaluate the right tools for you
https://123erfasst-de.translate.goog/technik-baustelle-innovative-technologien/?_x_tr_sl=de&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

Future of Facility Management
https://drive.google.com/file/d/1rl6Ac3OZhr3Y4U5ty4DhHqMPO32iQeo2/view?usp=sharing

Future of Site Management
https://drive.google.com/file/d/1-14Dh721mbAb5tQ2mxTets7eIxaVabaC/view?usp=sharing

Case Studies

How Delta Real Estate reduced reporting time by 81%
https://www.planradar.com/gb/customers/delta-real-estate/

Case Study Hamburg for using digital tools on the construction side
https://drive.google.com/file/d/1-frJm6HL8kPqBmSAcAe2ae-4RWyRwATK/view?usp=sharing

Time saving for Quality Assurance by digital tools
https://www.capmo.com/en/referenzen/huttenes-gmbh-architekten

Time Saving in defect Management by digital tools
https://www.capmo.com/en/referenzen/weiler-bau

Digital tool for Craftsmen
https://www.capmo.com/en/referenzen/wm-thermo-akustik

Comprehensive quality assurance and audit trails
https://www.planradar.com/gb/customers/innovare-systems-modular-construction/

Planning tools

Why BIM?
https://drive.google.com/file/d/100Zt0LTtxfIjUr65DGLlMoNbK0TI9CCY/view?usp=sharing

Great savings in property operation using BIM models
https://www.orthograph.net/Partnering/Downloads/Great%20savings%20in%20property%20operation%20using%20BIM%20models.pdf

Digital devices on the construction site

How Drones, Robots, & Big Data Transform Businesses
https://dronedeploy-www.cdn.prismic.io/dronedeploy-www/429cef90-681c-4053-a4fe-2f21c871e8ff_3+Phases+of+Physical+Automation+for+Enterprises+ebook+draft.pdf

Drones in Construction
https://www.propelleraero.com/drones-in-construction-why-they-are-beneficial-and-how-to-use-them/

6 Ways Drones in Construction Are Changing the Industry
https://www.bigrentz.com/blog/drones-construction

Drone in Construction & Infrastructure
https://www.jouav.com/industry/drone-in-construction

Robots Are Coming to the Construction Site
https://www.constructconnect.com/blog/construction-robotics

Robots on construction site
https://www.youtube.com/watch?v=0NYJ_9FIHZA
https://www.youtube.com/watch?v=wND9goxDVrY
https://www.youtube.com/watch?v=wlkCQXHEgjA

Robot capabilities on constructions sites
https://bostondynamics.com/video/meet-spots-expanded-product-line/

Benefits of flexible autonomy on construction sites
https://drive.google.com/file/d/1-7HNIKl-BdDVgBNcA2iYdWFP-LTorW9n/view?usp=sharing

General contractor Brasfield & Gorrie integrates Spot with DroneDeploy for automated and centralized site documentation.
https://bostondynamics.com/case-studies/brasfield-gorrie/

The Importance of Digital Twins in Construction
https://dronedeploy-www.cdn.prismic.io/dronedeploy-www/21265a44-5ca1-4b1f-8e7e-d3bf0159a55f_Drone+Site+Inspections-+The+Importance+of+Digital+Twins+in+Construction+ebook.pdf

3D Printing on the construction site

A critical review of 3D printing in construction: benefits, challenges, and risks
https://d1wqtxts1xzle7.cloudfront.net/85205027/s43452-020-00038-w-libre.pdf?1651294956=&response-content-disposition=inline%3B+filename%3DA_critical_review_of_3D_printing_in_cons.pdf&Expires=1692740713&Signature=O~Vz9hqa3ijoc~5Ho0oVSS18EkJHLbc8iLnM15VWhM-7yoXlUl8GalrQWdljsT6R~Em7AN0hqH0pM6Stl4LdrUKU~xIJWbWN9IHfvWw8ZOXqwcBd4LsLQR-Dd11B614xu5Tihif9nuct5gYRV0hbH4IuHu0u9cAjCbTfQwsLrJDld0afcMOSvLe6ivnpvqzKSw-8oRoK08ecksRozG~iDLeGM9AQXvtED-4m7jwR8g3E7KhZueStWaqpROMs4e~qFiGwsN81RdoG3xcIWes7SDs51HhLWJzgI3Q0xzA-

fOxSv7~91swqcpJMStRwzJcw-BQSh21YzO-m1QxAJpniQw__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

On site deployment of 3D printing for the building construction
https://hal.science/hal-03036156/document

Notes for the teachers

The material enclosed is an example showing how the topics of this course could be presented. Each teacher should adjust this to the circumstances of his own country, considering the local regulation the level and skills of the trainees, and the study programme of the students; are they studying construction, finishing, plumber, some examples to be given. Each programme may require different weightings and highlights, and it is on the responsibility of each teacher to consider these special needs.

Target group

Target groups of the further training are employees as well as entrepreneurs and managers of small and medium sized construction and finishing companies. The course is also suitable for skilled workers in constructing and finishing branches, and students in further vocational education in construction and finishing branches. The course suits well to others interested in digital collaboration, too.

Work required

In the curriculum, the average work required by each module is measured in working hours to make it easier for teachers to plan the practical application. However, the time required by the learning on the job phases is difficult to estimate. It depends on the length of projects and the difficulty level of project and learning tasks.

Teaching methods

Teachers are encouraged to use varying methods containing e.g.:

- Lectures,
- Visiting lecturers,
- On-line studies,
- Discussions
- Videos approaching the topics (Reliability of the source must be evaluated),
- Individual studies including learning tasks, and
- Assignments.

The project work is an essential part of the KAIN – method.

Cooperation with the local experienced industry practitioners is highly recommended. The good team spirit is important for creating an atmosphere of trust, and via this to enable sharing of knowledge and experiences that is an important part of creating a common knowledgebase.

Contents of the curriculum

The variation in regulations and circumstances and qualification requirements are quite different in the BSR-countries, thus the material was written only as a form of framework inside which the local actors should modify the contents of modules according to their own regulations and local requirements, without forgetting the needs of different study programmes. By using innovative, problem-based, and experiential educational approaches, teacher will be able to support students to create an atmosphere that enables to share knowledge and experiences, and to learn, how to co-operate with the help of digital solutions at construction sites.

The overall objectives of the curriculum are:

- The participant deepens his/her knowledge about underlying basic information concerning digital solutions supporting working processes in the construction and finishing business.
- The participant understands the regulatory and theoretic framework behind the working processes
- The participant can implement and run working processes in a digital way
- The participant reports the results of the project (and self-learning tasks if used) and reflects the successes and failures evaluating the process and his/her own role.
- The participant deepens his/her knowledge about common digital tools and their usability in the context of construction business.

The curriculum is divided into modules as follows:

- Module 1: Basic knowledge and instructions for the learning on the job phases.
- Module 2: Learning on the job phase
- Module 3: Educational block phase
- Module 4: Learning on the job phase
- Module 5: Reporting day phase

3. Program for the implementation of training and coaching

Training and Coaching Programme: Knowledge Acquisition according to Individual Needs – KAIN

A striking obstacle faced by SME is lack of time and permanent overburdening of their owners as well as their impossibility to release employees from work for a long-er scope of time to engage them in advanced trainings. There is also particular interest in ensuring that, as far as possible, qualifications offered should match individual skills needs of the employees and, at the same time, address specific SME issues. In response to such demands, a structural concept will be applied in the project, consisting of the following items:

- 2-3 learning phases with classroom teaching, delivered on two days per week, possibly Fridays and Saturdays.
- in between, longer on-the-job teaching periods at the trainees' workplace with simultaneous realisation of innovative development projects in SMEs, covering three to four months.
- Proposal for teaching periods at the trainee's workplace:

a) coaching by same trainers that are also delivering classroom teaching,

b) optional and customised e-learning options,

c) implementation of a specific development project within the company, in the topic area of the respective advanced training, involving as many employees as possible, thus, ensuring joint team learning.

The successfully tested and implemented methodological framework (training meth-od) KAIN

- creates a common knowledge base for participants with different backgrounds in training and consulting processes,
- takes particular account of the individual experience of participants,
- shows possibilities to change/improve the situation of the participants on site for the pursuit of project goals and change measures,
- sharpens the knowledge of possible needs for change,
- enables those involved participants to design the right measures and implement them correctly, and
- combines qualifications with the implementation of innovative development pro-jects in companies.

KAIN describes the tasks of trainers / consultants to carry out qualifications within the framework of continuing vocational training, to accompany the implementation of company-specific development projects and to enable company employees to carry out change processes under the supervision of external consultants.

The qualification and consulting process is composed of three phases:

1. classroom teaching

2. self-study with external support

3. report and reflection.

The overall aim of the training is to ensure that all participants have sufficient information and knowledge on how the basic training idea can be implemented and pursued under the individual (quite different) framework conditions on site. Hopefully they will gain confidence in the feasibility of change processes.

Part 1: Classroom Teaching

Duration: approx. 2 days

Key objective: imparting knowledge - forming a common ground within the group.

This training module basically consists of a 1.5-2-day workshop, during which participants learn about (usually science-based) models and (conceptually) apply instruments of project-related research for structuring and solving problems. This is in-tended to form a common conceptual ground for further training steps. The present-ed models and instruments (recommended for practical application) ideally form a common framework, mainly to better integrate existing experience of course participants in pursuing their training goals. The participants` experience may complement or modify the research proposals on structuring and solving problems. Such approach enables a desired (conceptual) adaptation of the proposed models and instruments to the individual participants` needs and specificities (given the diversity of their situations) at an early stage of the training.

Observance of the participants` individual needs and specificities in classroom training requires a high degree of expertise and experience by trainers, including their ability to use interactive and participant-oriented didactic methods.

Another addressed focus in the first part of the training is communicating to the trainees' relevant issues with regard to planning, implementation as well as to (critical) assessment of their own projects that are processed in the second part of the training. Thus, another key objective of this part of the training is to equip the trainee with critical impulses for processing the presented models and instruments in his individual project. In a sense, application and implementation of the presented models and instruments by trainees at their work constitutes the primary focus of the second part of the training concept.

Tasks of the trainers/consultants:

This consideration of the individual needs and particularities of the participants on site in a face-to face training requires a high degree of knowledge and experience with the use of interactive and participant-centred didactic methods on the part of the trainers.

A further focus of the first part of the training is to introduce the participants with the planning, implementation and also (critical) evaluation of their own project, which is to be dealt with in the second part of the training. Thus, another central goal of this part of the training is to give the participants important impulses for the implementation of the presented models and instruments in their own project. The application and implementation of the presented models

and instruments by the participants "at home" is, so to speak, the focus of the second part of the training concept.

Part 2: Self-study in own company/organization with the support of trainers

Duration approx. 12 – 18 weeks

Key objective: transfer and practical application of acquired knowledge in the trainees` individual job practice; special role of the trainer as consultant and coach.

In the second part of the training, trainees are tasked to apply skills and knowledge acquired in the first part of the training with respect to their individual job practice at their company/organization, in line with the training idea. For a sustainable learning effect, it is crucial that trainees plan, implement, evaluate, document and critically reflect on their own project or their own activities with regard to improving their individual situation, basically under their respective “here-and-now” conditions.

This course phase is accompanied and assisted by trainers and their technical advice and support. Basically, trainees are on their own with respect to applying and implementing knowledge acquired in Part 1. As a rule, however, advice and support are usually required in order to properly enjoy the benefits of adaptive process of newly acquired knowledge from the training Part 1, now under real-life conditions, and to turn the project into success. Support by trainers may vary, from a rather simple general advice in the sense of passing on relevant information up to an in-depth assistance-like coaching. Normally, it is advisable to decide on case-by-case basis which type of support is best suited to enable each trainee achieving individual project goals.

At this stage, it is certainly possible, if not uncommon, that in processing the models and tools presented in Phase 1, the trainees` projects may differ from their initial concepts and plans. In such case, trainers may lend a helping hand in bringing back on track “real” project goals.

The second part of the training has a particularly welcome didactic attribute, allowing for fine-tuning improvements on the job / in one´s own company, thus, ensuring high learning motivation. As a rule, this type of learning, embedded in real job conditions, involves committed personal involvement of company management and other employees, and, by joint team learning, delivers expressive multiplier training effects.

Further advantages are straight implementation of the acquired new knowledge in daily job operations; project-related innovations are in the interest of corporate management; they become quickly tangible, and managers feel encouraged to continue with advanced trainings for their employees, turning them into a strategic instrument of corporate management. Apart from this, this training approach meets particular needs of SMEs, which biggest barrier to good training is their lack of time. Under KAIN training method, lost working hours and work absences are almost entirely avoided.

In the second part, the participants have the task of applying the knowledge ac-quired in the first part and the knowledge of how to shape their own practice in the sense of the training idea in their companies/organizations. For a sustainable (learning) effect it is necessary that they plan, implement, evaluate, critically reflect and document their own project or activities to improve a situation on site under their individual framework conditions in the "here and now".

This phase with the duration of approx. 12 – 18-weeks is accompanied and support-ed by professional advice and support from the trainers/consultants.

If necessary, additional one to two-day workshops with classroom teaching can be conducted during Phase 2.

Tasks of the trainers/consultants:

At the beginning of the longer phase of learning on the job, the innovative development project to be realized is defined and prepared in the company. The trainer ac-companies the work to realize the development project in the company and involves other consultants and experts as needed. The support of the trainers can range from a rather simple general consultation in the sense of passing on relevant information to an intensive accompaniment in the sense of coaching. In individual cases, it is usually necessary to consider what kind of support is needed to enable the individual participant to pursue his or her individual project goals.

In this phase it is quite possible and not uncommon that when applying the models and instruments presented in phase 1 in practice, the individual project proceeds differently than initially thought and planned by the participant. Even in such situations, the trainers of the project team can provide valuable support in pursuing the "actual" project goals.

This second part of the training enables in particular the very welcome didactic aspect of working on concrete improvements in one's own company / at one's own workplace, which is associated with a high motivation to learn. In this learning pro-cess, the company management and other employees are usually intensively in-volved in what is actually done at the workplace, thus achieving joint learning and strong multiplication effects in the training.

Further advantages are that what has been learnt is directly implemented in every-day business life, that the innovations associated with project work are in the interest of company's management, quickly become visible and motivate managers to promote further training for the workforce and to use it as a strategic instrument of company management. It also responds to the particular needs of small and medium-sized enterprises, which are constantly suffering from a lack of time as the biggest obstacle to training. The KAIN Training Method generally almost completely eliminates absenteeism.

Part 3: Individual project presentation and reflection

Duration approx. 1.5 – 2 days

In the third part of the training, experience and insight gained will be presented and exchanged at a joint event, in emphasis on presentation of individual participants` projects. Both, the trainees and the trainers, will be tasked to review and reflect on projects presented by the participants and to analyses answers with respect to a possible contribution to sustainable training target tracking. Moreover, a further key goal may help identifying major barriers to "not-yet-a-success" and fix them in the future.

The exchange of information amongst participants may provide valuable information on how to improve their own projects to be even more successful.

Tasks of the trainers/consultants:

- enable constructive exchange between the participants,
- focus on the common basis for the pursuit of (general) training objectives, and
- moderate an instructional discussion on the identification of supportive,
- ideas on struggle-free implementation solutions for trainees` projects, and
- obstructive conditions of change processes and present contributions for a possible reduction of resistance in the tracking of individual projects.

Of course, upon completing third part, subsequent longer self-study phase may fol-low, combined with on-the-job implementation, followed again by classroom-teaching in form of a third workshop, etc.

At the end of the training, all participants should have sufficient information and idea on how to implement and pursue the basic training idea, mostly under different real-life conditions.

Time-organisational setup and competencies of participants

For sure, a truism that in a large-scale transnational project, participants from different countries would never be able to match their time frames to enjoy joint meetings and events. Yet, planning and delivery of training to a specified target group and their participants, requires that

- participants of Part 1 are in, any case, also participating in training Part 3. Where appropriate, couples or small teams should be made available as representatives of a project team with respect to these training parts,
- participants are experienced in presenting content or in using interactive training design methods, or they are trained to meet required demands,
- participants are to a certain degree involved in decision-making or co-determination in their company/organisation with respect to pushing through their projects and receiving appropriate support from senior management.

As a rule, participation in the seminar is subject to a fee.

The offering institutions may attach obligations to the paid course, e.g. that a fee is due for the arrangement of consultancy services and/or a written a written report on the results of the consultation processes must be provided.

The selection of companies/persons for the training and consultations depends on the interests of the companies. In an active approach, a pre-selection can be made on the basis of individual criteria, e.g. sector, company size, state of technology use, quality of personnel policy, innovation orientation, ..., i.e./with other words the maturity level of the organization.

The size of the group should not exceed more than ten and not be less than three or four companies. Enterprises may be allowed to send more than one person (project group). The total group should not exceed more than fifteen persons.

The persons from the companies should have the right to make decisions or have a say in their organizations in order to be able to decisively advance the pursuit of their individual projects.

The participants should decide at the end of part 1 to carry on with parts 2 and 3. Otherwise resources will be wasted. If there is a fear that problems will arise in part 2, it will be better to do a small project for testing rather than too many or too large projects. And: Even from failed projects something can be learned.

The companies can exchange their ideas and experiences during the development phase, e.g. develop measures together.

Requirements for trainers/consultants

At various points in the brief description of the training method it became clear that the trainers have a special role to play in the use of this method, which is underlined here again.

In general, the trainers/consultants should have experience in presenting content and using interactive methods to design training.

Against the background of an overview knowledge covering all relevant subject are-as the trainers are not only representatives for a variety of project topics and con-tents, but also –from a didactic-methodical point of view – moderators, learning (pro-cess) facilitators, coaches, sometimes co-managers, consultants, and even learners.

In individual cases, they must also decide in what form the involvement of experts and specialists on a (detailed) topic is necessary for highly specialized topics. This requires a good network.

A special challenge for the trainers is when they are in the role of a coach, who may also have to provide individual support for the learning processes of individual participants in the pursuit of a project on site.

Within the framework of a Train the Trainer program for teachers to conduct further training, teachers are familiarized with the KAIN method and taught skills for its ap-plication.

The qualification seminar must be advertised and promoted intensively.

- Early and repeated announcement of courses in professional journals, on websites, via newsletters, circulars, etc. are needed.
- Repeated dissemination of information via various media channels – in writing and particularly active in face-to-face meetings, in form of individual consultations, at meetings, trainings, via consultants, etc. should be done.
- Production of posters, hand-outs with invitations to advanced education training courses or related information on counselling events and information placement/introduction in educational establishments, chambers, universities, etc. are additional possibilities.
- Co-operation with local/regional/national institutions, e.g. business and urban development; employers' associations, trade unions, employers' liability etc. may extend the reach of the acquisition.
- If you have an address pool of trainers and consultants: Sending personal invitation letters with indication of date, including a reply sheet by mail and/or by e-mail and possibly repeated telephone follow-up activities to addressed potential participants
- Conducting press conferences/discussions and issuing press releases to achieve publications in the daily press.

- Involvement of relevant multipliers who approach potential participants in person
- Use every opportunity for personal contact to pass on information and to advice potential participants about your measures.

Implementation the Training / Organisational Preparation

- Assuring timely and binding reservation of training rooms and securing an adequate equipment.
- Timely recruitment of lecturers and organising a complete teaching timetable for each respective complete advanced training block.
- At least one full-time lecturer shall be active and/or a competent specialist on the respective training topics.
- Timely preparation and provision of documents, materials, etc. for
  - all teachers and staff.
  - all participants.
- Provision in paper form as well as electronically
- The following documents and materials have been designed and are available free of charge: Concept, Curricula and Teaching materials for a SME specific digital competence training programme.

Evaluation of Training Seminars

Any training seminar is subject to evaluation in order to identify and implement further developments and improvements in future training programmes.

For this purpose, written and oral interviews with the participants and lecturers shall be conducted.

The concepts, questionnaires, guides etc. developed are free of charge for all and any future use.

Coaching Process

The entire training from the first approach of the participants to the execution of the test and the end of the training must be accompanied by individual coaching, which is particularly intensive in phase 2 of the training. Within the scope of the coaching, all relevant subject areas must be covered, for example, consultations with the participants and the participating companies, transfer of know-how and information, determination of needs and implementation of follow-up training, referral to experts, organization of information and experience exchange, etc., up to assistance with personal questions or problems.

The words “coaching” and “consultation” are often used interchangeably. However, strictly taken, these concepts imply very different notions. Coaching focuses on a goal-and results-oriented process which helps clients to find their own solutions. It is therefore understood as a method that enables those facing special (often professional) challenges or problems to manage them (largely) independently. Due to this self-understanding, it becomes clear that a coach is not an advisor or consultant answering the questions of the person seeking advice, but a coach enables the client, through certain questions and techniques, to ask the “right” questions and find the answers by him or herself.

The task of consultants or advisers, on the other hand, is to answer specific questions of the person seeking advice as an expert on the topic. Hence, the solution or answer to the question of the advice seeker is given by another person, implying that the person seeking advice does not need to further investigate the issue.

Nevertheless, there are some common characteristics of the two processes:

Profound expertise and professionalism: usually acquired through university studies, training and with extensive professional experience

Reflexivity: Here understood as a systematic and well-founded thinking about one's own actions and activities as well as the structures and processes with which one pursues a goal.

Value orientation and positive image of man understood here as an appreciation and recognition of the diversity of personalities, a personality's dynamics and changeability

Working in and with networks: as a necessary condition for pursuing goals and increasing professionalism.[3]

As part of the DIG-CON project, due to the complexity of challenges and issues faced by participants and SMEs, it can be assumed that there will be no clearly defined border between coaching or counselling support from the coaches/advisors. Both can be appropriate, important and necessary depending on the case. Therefore, consulting or coaching is seen in this context as an interactive process in which both, the strong support of the consultant or coach and active participation of the person seeking advice, is of immense importance for solving the problem at hand.[4] Within the "ICI4SMEs" project, this process should be based on the "Case Management Model" increasingly used in the realm of social work.[5]

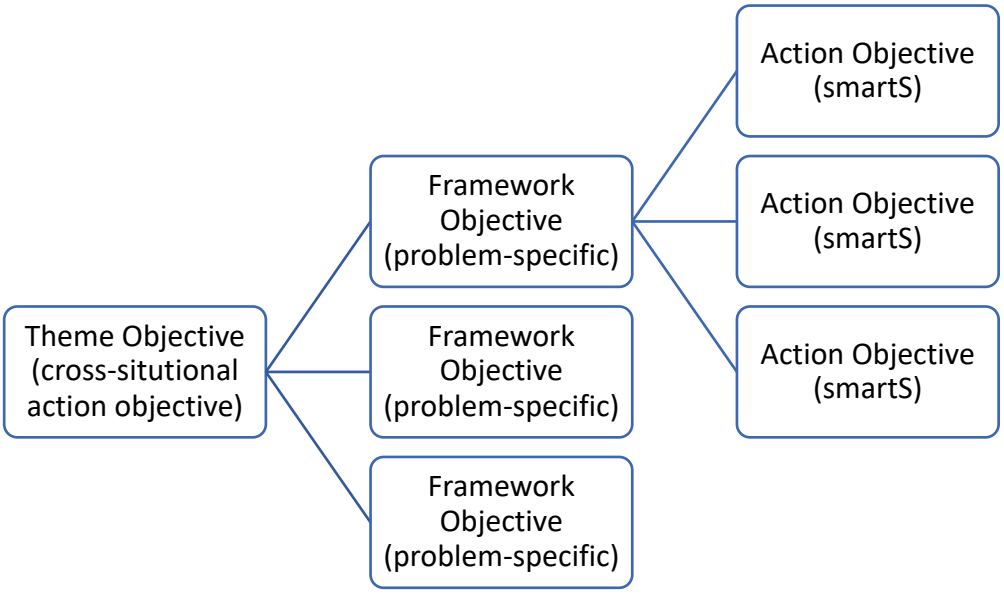
Case management is an extremely complex and intensive process carried out together with the advice seeker. It is always on a voluntary basis and requires the consent of the person seeking advice. Cases in which a case management structure is worthwhile are particularly complex problem situations for whose solution a large number of helpers from different areas is required. This also means that multiple coaching sessions will be necessary. Furthermore, setting up case management structures is a time-consuming and labour-intensive process. Therefore, it cannot be expected that the advisors/coaches of the project participants will fully implement this concept. Nevertheless, it should serve as a suggestion for structuring the coaching process.

The case management process is divided into two levels: the case level and the (care) systems level. At case level, the case manager focuses on the person seeking advice. First, the case is assessed. In this phase information is collected comprehensively, systematically and without judgement or evaluation. The next step of this phase is a conscious decision which problem should be worked on made jointly by the case manager and the advice seeker. Once this decision

[3] Cf. https://www.unternehmer.de/management-people-skills/128418-die-coaching-serie-teil-i-was-istcoaching-ueberhaupt or https://www.unternehmer.de/management-people-skills/131706-die-coachingserie-teil-ii-wo-liegen-die-grenzen-von-coaching
[4] Cf. Nußbeck, Susanne (2010). Einführung in die Beratungspsychologie (2. Ed.). München: Reinhardt.
[5] Cf. Müller, Matthias (2016). Case Management in der Migrationsberatung für erwachsene Zuwanderer (MBE) – Eine Arbeitshilfe (1. Ed.). Berlin: Deutscher paritätischer Wohlfahrtsverband Gesamtverband e.V.

has been made, hypotheses are formulated to come up with different explanations for the selected problem. These hypotheses facilitate the formulation of action goals in the next phase. In the case of this project, the selected problem should be the desired self-employment as entrepreneur. Furthermore, it is important to record strengths, competences and resources of the participant to be able to draw on them when solving the selected problem during the coaching process.

In the next phase (planning) an individual support plan is drawn up. Here, a distinction is made between theme, framework and action objectives. It is crucial to adhere to the hierarchy moving from the abstract theme objectives to the concrete action objectives. Theme objectives take interests and hopes into account, they are personal, easy to understand and formulated in a positive way – they reflect the participant's visions. Framework objectives relate specifically to the guiding problem (i.e. self-employment as entrepreneur) and its explanation hypotheses. They are generally in line with the theme objectives. Lastly, action objectives are formulated to concretely implement the framework objectives. They are incremental and must be manageable for the participant. The so-called smartS criteria (specific, measurable, acceptable/attractive, realistic, timed and strength-oriented)[6] should be taken into account when formulating the action objectives.



In the case level's next phase, it is a matter of implementing the defined objectives. In contrast to regular counselling, in case management this phase is more than just a recommendation and placement into assistance services. Here, close accompaniment and, if necessary, support is foreseen. The process is oriented towards the wishes, strengths and resources of the participant to initiate a helping process that is as autonomous as possible (keyword empowerment). If many different institutions work together, so-called case conferences can be of an advantage to make cooperation more effective.efore ending the case management process as well as already during

[6] Cf. Ehlers, Corinna/Müller, Matthias & Schuster, Frank (2017). Stärkenorientiertes Case Management: Komplexe Fälle in fünf Schritten bearbeiten. Opladen u.a.: Barbara Budrich Verlag.

the implementation phase, the process should be closely monitored and if, necessary, modified by the advisor/coach. The close accompaniment of the change process by the advisor/coach offers the participant additional support.

The end of the process should be active and binding. It contains elements of reflection, evaluation and farewell in which the handling of new situations without the advisor/coach should also be discussed.

The systems level of case management focuses on all the organisations and specialists who are involved in the solution process for those seeking advice. Here it is helpful to fall back on already existing networks of the advisor/coach as well as of the participant.

Effective Teaching and Training Techniques[7]

Principles of effective Teaching

The first part of the pedagogy deals with effective teaching. Pedagogical approaches, presentation skills, attitude awareness, motivation and engagement (i.e. involvement of participants) and evaluation issues. There are several links to different kind of document, reports and videos about how to improve the training sessions. The further information links and other sources have been accessed 10.4.2015.

Learning involves acquiring new knowledge, skills and attitudes that result in change in participants' ability to do something. The components in learning process include knowledge acquisition, thinking for understanding and doing in practice.

What makes the training programme successful?

The purpose of this training program is to impart knowledge of a concept and its application in SMEs. Participants may have worked with something similar (like resource efficiency, material efficiency, resource or material saving, environmentally friendly technology) before, so they have a solid background on which to build. When is the training successful? To achieve the success criteria the training should have a clear agenda of the topic to be covered, well defined target group, have enough time to the planning, have well defined programme specific learning outcomes, have teachers, instructors or presenters who are familiar with the topic, involve participants, have organisational support systems for the very first steps of the training, use quality measurement system (based on evaluations, feed-back analysis), etc. The list is really long and demanding and organizing training programme may be a real challenge.

Training session should respond to the participants learning styles. In general, there are three types of leaners:

- Visual: These learners receive information best through seeing or reading it. This type of learners benefits from written instructions, diagrams, handouts, overheads, videos, and other visual information.

[7] Sirpa Sandelin, Satakunta University

- Oral: Oral learners receive information best when they hear it. They respond best to speakers, audio conferences, discussion groups, etc.
- Kinesthetics: These learners learn by touch and feel. They respond well to demonstrations and in having the chance to practice themselves.

Trainees are individuals. Sometimes trainers may encounter themselves in a demanding position with difficult participants. Table 1. gives some strategies to cope with difficult participants.

Table 1. Ways to survive with difficult participants (Swan and Morgan 1993, sited in Assistive Technology Trainer's handbook, http://www.natenetwork.org/manuals-forms/at-trainers-handbook, p. 86-87)

Behavior	Possible reasons	Strategies for presenters
The aggressor		
Confrontational, challenging and unpredictable. May include direct confrontation or constant "supportive" criticism of present ideas.	Need to win. Desire to be the leader. Need to control the group or the outcome of the training.	Remain calm – do not engage in the confrontation. Ask for explanation and clarification of concerns. Seek feedback from other participants. Redirect the conversation back to content. Model ways to permit differences of opinion to stand. Use humor. Be friendly and relaxed. As a last resort, discuss the behavior in private during a break.
The isolate		
Does not participate or frequently leaves the session for other activities such as phone calls.	Anxious about speaking. Unsure of own knowledge. Unwilling to commit to the work. Insecure about working with others.	Ask questions that require yes, no or very short answers to get things started. Offer activities for pairs or very small groups. Assign each person in the workshop specific task to be reviewed by the

	May not want to be in the workshop. May have pressing needs than the content of the training.	presenter or other participants. Ask questions that are about the isolate's areas of expertise or strengths. Work with the person one-to-one or ask about the reasons for non-participation.
The negative		
Responds negatively to any new idea or task. Refuses to try new ideas or to consider them.	Poor self-concept. Lack of faith in ability to do the work. Has been required to attend the training.	Stay positive. State your perceptions of the situation in positive ways. Do not argue. Do not problem solve for the person. Brainstorm with the large group about ways to address the negative aspects that person identifies. "What would it take..." Ask the group to reserve judgement until the end. Ask what part of the topic could be adopted.
The monopolize		
Talks for long periods. Interrupts others. Repeats concerns frequently. Tries to speak first. Does not listen.	Insecure about participation. Insecure about own knowledge base. Need for attention. Need for approval from the presenter or the group. May be naturally talkative.	Odder activities that require turn taking and multiple speakers. Offer activities that require each person to respond or pass. Encourage participants to offer feedback to each other rather than in the large group.

	May desire to be in charge of the outcome.	Provide a time limit for comments and questions that everyone in the group must abide by.
The expert		
Says that s/he already knows the content. Talks a lot. Volunteers to help the presenter. May offer incorrect facts.	Seeking respect and acknowledgement from other participants. Seeking approval or connection with the presenter.	Ensure opportunities with others. Spend a break or part of a lunch with the person.

Further information:

Guide for Training in SMEs is available in several languages
http://ec.europa.eu/social/main.jsp?catId=782&langId=en&pubId=416&type=2&furtherPubs=yes

Presentation skills

Lectures

When planning a training session, trainers should pay attention to what trainees remember from it. Estimated learning takes place:

- 10 % of what they read
- 20 % of what they hear
- 30 % of what they see
- 40 - 50 % of what they see and hear
- 50 % of what they discuss
- 70 % of what they experience
- 90 % of what they say as they do

Trainers should engage participants in thinking, questioning and experiencing themselves. Thus, trainers should not speak all the time alone, because effectiveness of learning decreases very soon, if participants are not integrated in the training.

Icebreakers

In the beginning of the session, it is important to get participants involved and engaged in an activity that requires them to talk and cooperate with the others. Icebreakers are the simple activities used at the beginning of a session to help participants learn each other's names and/or backgrounds, share their experiences, or introduce the topic of the lecture. The right icebreaker can help to get a positive and enjoyable learning experience for both the trainer and the participants. During the icebreakers participants should connect with at least one other person.

Icebreakers should be topic related and at low risk so that participants would feel comfortable and easy. Time used for icebreakers should not be too long compared to the length of the session.

Further information:

- The Assistive Technology Trainer's Handbook is a toolkit for assistive technology training, and it offers wide range of information related to the training sessions, for example icebreakers, presentations, brainstorming etc. http://www.natenetwork.org/manuals-forms/at-trainers-handbook
- Creative Icebreakers, Introductions, and Hellos for Teachers, Trainers, and Facilitators – manual has 15 ideas for icebreaking in the beginning of trainer's session. http://www.businesstrainingworks.com/training-resources/free-icebreakers
- Re-thinking Progress: The Circular Economy
- https://www.youtube.com/watch?v=zCRKvDyyHml

Presentations

The presentation (e.g. PowerPoint™ or Prezi (Prezi.com)) is used to support the content of the training and thus it should be clear and easy to read. The presentation is designed to be a visual support for both the trainer and the participants.

- Assistive Technology Trainer's Handbook http://www.natenetwork.org/manuals-forms/at-trainers-handbook
- Presentation Skills Training Resources and Articles http://www.businesstrainingworks.com/training-resources/presentation-skills-articles

Figures, Tables and Videos

In order to improve the attractiveness of the lecture and the presentation it would be advisable to include figures or tables or videos into the presentation/ the lecture. Figures and tables illustrate the situations well and thus make it easier for the participants to assimilate the gained information. Presentations of success stories and case studies can be also included to this section. Internet and YouTube offer good opportunity for researching suitable videos.

Further information:

- Training of Trainers manual information and guidelines for making training sessions, they have also good information on figures and tables. http://hcfp.gov.in/downloads/manuals/Training_of_Trainers_Manual.pdf
- Video (15 min.): Environmental Compliance Assistance Programme for SMEs: How to become an SME in a circular economy (26/11/2014) https://www.youtube.com/watch?v=V1Tszs48xCI&list=UU6K5qD2KWFY8saNG0QpEWtQ
- Video (3 min.): Euro news Business Planet: Upgrade to the circular economy (28/11/2014) http://www.euronews.com/2014/11/28/upgrade-to-the-circular-economy

- Video (37 min. in German) Prof. Dr. Braungart über sein "Cradle to cradle"-Konzept auf der Utopia Konferenz https://www.youtube.com/watch?v=ACT7xbEe6Os
- Video (6 min.): Introduction to Cradle to Cradle https://www.youtube.com/watch?v=QMsF1P-_vWc

Attitude awareness, motivation and engagement

According to the Fogg Behavior Model, people take action when their motivation and ability to complete a task are both high and there is a triggering element (Figure 1). Behavioral changes will be expected during training if all three elements are present at the same time. The model highlights three principal elements and their subcomponents:

- Core Motivators (Motivation): pleasure/pain, hope/fair, social acceptance/rejection; sensation, anticipation, belonging
- Simplicity Factors (Ability): time, money, physical effort, brain cycles, social deviance, non-routine
- Triggers: facilitator, spark, signal

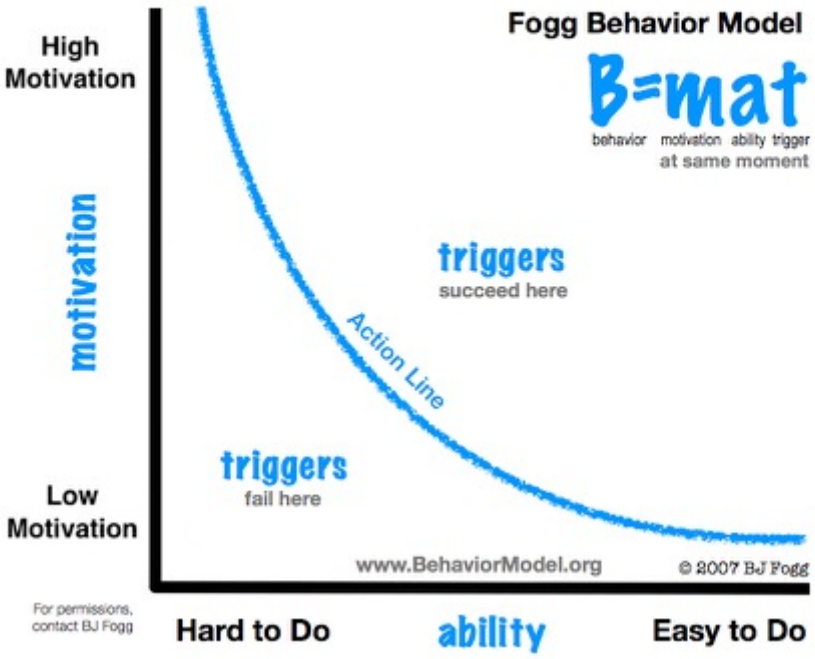


Figure 1. Motivation, ability and trigger (Fogg, B.J., 2015, http://www.behaviormodel.org/)

In the planning and implementing training sessions trainers have to create and keep the high motivation level, give skills to do things easier, and give something that calls to action. Training should give a positive learning experience and a feeling of a victory.

Attitude can be dealt in different ways during the training. Depending on what type of attitude question we have the solution of influencing into the attitude is somewhat different. Is there a need for attitudinal change, future oriented attitude, more positive attitude or an attitude that can see the comparative advantages? The training course objective should be created in a way that it

emphasizes the nature of attitude change. With the concept the change should be seen both in participants' own attitude and in the attitude in SMEs to gain comparative advantages. Also, the importance of the concept in a global scale should be emphasized.

Effective training and learning relay on motivation. Trainers face challenges in making the lectures more interesting and motivating. Unfortunately, there is no single answer how to motivate participants. Trainers are advised to accommodate different learning styles, like visual, oral or kinaesthetic, during their training sessions.

When implementing the Train the Trainer programme trainers should consider how they can translate theory into practice. Experimental learning is very powerful when trainers can combine participants' own experiences with the training programme contents.

There are a range of exercises the trainer can effectively use in order to involve in the participants as much as possible to the learning process. The best way for adults to learn is when the new course material is based on their experiences, but when there is also left space for the debate among the participants. Many participants are experienced personnel who have valuable information to contribute. There are varieties of training methods and together they can give the possibility for a multifaceted understanding of the course material.

One way to activate trainees is to include storytelling in the training sessions. Stories may make communication easier and insert personal touches in the sessions. Stories can be used as examples of right and wrong ways to perform tasks or skills. They could be used to activate participants to find different views on the topic. Trainers should also give floor to the participants' own stories.

There are several ways trainers can use to engage your audience throughout the training sessions:

- interesting materials, which will be used after the training, too
- pair or group discussions, involve participants in one way or another
- case studies and examples from real life situations
- role plays are excellent for example in supervisory, mentoring or coaching situations
- demonstrations, videos, material samples, process simulations, etc,

Further information:

- The Trainer's Survival Guide has 25 different activities that make lecture-based programmers more active. They can be used during the training session and they have tips for the trainer to get participants involved. http://www.leotrainer.com/tactiveteach.pdf
- 10 Best Practices for Using Storytelling in Training http://ec.europa.eu/small-business/index_en.htm
- Why Is Story Telling So Powerful In Learning, And How Can You Learn The Skills http://ec.europa.eu/small-business/index_en.htm

Evaluation

Evaluation of the effectiveness of the training is important task. After the theory session trainers or organizers can collect feedback with questionnaires which participants can fill in onsite. Allow

enough time for completing the forms, and allow also time to discuss what participants have learnt and how they are going to use that knowledge. The subject of the evaluation is

1) the course itself with all the topics an gained knowledge
2) the framework conditions out of the course: lecturers, organization, materials etc.

Based on the evaluation results, trainer can reveal the whole training outcomes against the expected outcomes, find out eventual weaknesses and get information about new aspects to be incorporated into the programme.

Effective Training Techniques

The second part of the pedagogy deals with mentoring and coaching, spreading best practices, learning from the worst cases, effective questioning and appreciative inquiry, and creativity and innovations. There are several links to different kind of document, reports and videos about how to improve the training sessions. The further information links and other sources have been accessed 10.4.2015.

Learning involves acquiring new knowledge, skills and attitudes that result in change in participants' ability to do something, i.e. in this Train the Trainer programme the ability to apply the trainings. The components in learning process include knowledge acquisition, thinking for understanding and doing in practice.

Group work and brainstorming

Group works can be applied in learning if the trainer wants participants to deal about the issue by debating and discussing. Group work in small groups gives all participants the opportunity to participate in the exercises and thus express their ideas. In order to get the best out of the group works would be good to get them goal-oriented. The participants should understand the task of the group work at hand, the time-frame and the way of presenting the results.

In brainstorming the trainer asks an open-ended question and the participants come up with as many solutions as possible. The idea of brainstorming is to get participants involved and engaged in the training. Brainstorming should be based on few rules in order to get the best results. Example of the rule could be that there are no stupid or bad ideas.

Further information:

- Trainer's Handbook, Assistive Technology Trainer's handbook http://www.natenetwork.org/manuals-forms/at-trainers-handbook
- Trainer's Handbook http://hcfp.gov.in/downloads/manuals/Training_of_Trainers_Manual.pdf
- MindTool Brainstorming http://www.mindtools.com/brainstm.html

Mentoring and coaching

The Business Dictionary gives the following definition to mentoring and coaching:

- mentoring: "Employee training system under which a senior or more experienced individual (the mentor) is assigned to act as an advisor, counselor, or guide to a junior or

trainee. The mentor is responsible for providing support to, and feedback on, the individual in his or her charge". (http://www.businessdictionary.com/definition/mentoring.html)

- coaching: "Extending traditional training methods to include focus on (1) an individual's needs and accomplishments, (2) close observation, and (3) impartial and non-judgmental feedback on performance". (http://www.businessdictionary.com/definition/coaching.html)
-

Mentoring can be described as partnership between two people working in a same field or sharing same experiences. A mentor is a person helping the mentee to develop solutions to career related issues. Mentors should be helpful and get the mentee to believe in him/her while boosting his/her confidence. A good mentor also challenges and questions mentee, but in the meantime provides guidance and encouragement. The most important meanings of mentoring are to enable others to become more self-aware, to make them take responsible for their life and to direct their life in the direction they decide.

Coaching focuses on the individual needs of a person and is generally less formal than other kinds of training. A manager, supervisor, or other employees serve usually as the coach. The coach works with the employee being coached when time allows and works with this employee to answer questions, make suggestions, leads to right track, and gives support and feedback. The differences between coaching and mentoring are shown in Table 2.

Table 2. Differences between coaching and mentoring (http://www.management-mentors.com/resources/coaching-and-mentoring/)

Coaching	**Mentoring**
Task oriented	Relationship oriented
Short term	Long Term
Performance driven	Development driven
Can be done as needed; no design necessary	Program design needed to create effective program
Manager directly involved	Manager involved only indirectly
More easily evaluated and measured for ROI	Less easy to measure for ROI
Reliance on performance management systems, e.g. reviews, 360's etc.	Not dependent upon performance management systems
Feedback by coach to manager about progress in development	No feedback by mentor to manager

Coach paid for services	Mentor receives no compensation
Coach operates independently	Mentors operate with assistance from the Mentoring Program Manager
No training of coaches needed	Mentors and mentees trained
Focus is more on business issues than personal	Focus is on personal and professional development
Lower initial investment cost	Higher initial investment cost (lower over time)
Lends itself to online software	Management of the mentoring program lends itself to software but not the relationship itself
Coaches leave organization when done	Mentors and mentees remain in the organization and can provide ongoing mentoring to others
Done by inside or outside content expert	Mentors are normally within the company
Can be done for remedial purposes	Never remedial
Internal politics not usually affected	Internal politics a consideration in program design
Cultural change may/may not occur	Mentoring is transformational and affects the culture
Diversity may or may not be included	Diversity is a component of mentoring
Coaching done 1-on-1	Mentoring most often is done 1-on-1 but other models may be used as well
Content expertise more important in coaching	Interpersonal skills more important in mentoring
Manager can be coach of own employee	Mentor is outside mentee's direct supervisory line
Coaching is one-directional	Mentoring is bi-directional
Coaching is focused on the business person	Mentoring involves the whole person
Behavioral transformation	Personal transformation

Further information:

- Information on business mentoring, successful mentorship and the benefits of mentoring can be found from the Website http://www.micromentor.org/resources/resource-center
- Best practices for mentoring http://www.micromentor.org/learn-more/mentoring-best-practices
- The Differences Between Coaching & Mentoring http://www.management-mentors.com/resources/coaching-mentoring-differences/
- Videos: http://mentoring-works.com/resources/videos/

Effective questioning and appreciative inquiry

Learning can be promoted by effective questions. By questions trainers can motivate participants, keep their interest on the key issues, and engage them in the learning process. Questions can also be seen as means of fostering knowledge sharing and creation among participants. Should you be worried if participants do not have questions? Yes, you should. In the beginning of the session's trainer should encourage participants to ask questions. There are no silly questions. If there are no questions from the audience, pose them a question. If you do not know the answer, ask help from the participants. Someone from the audience might know the answer. Of course, you can always give links to Internet sites with further information.

In the SMEs problems can be solved by using the 4D-model or 5D-model. The four common phases are:

- Define: you have to know the current situation and it's positive aspects
- Discovery: analyse what works well currently
- Dream: dream vision of what is the bright future, brainstorm creative and innovative ideas
- Design: build the dream, plan systems, processes, and strategies

The fifth phase in the 5D-model is (Figure 2.):

- Deliver, which is the implementation towards the dream.

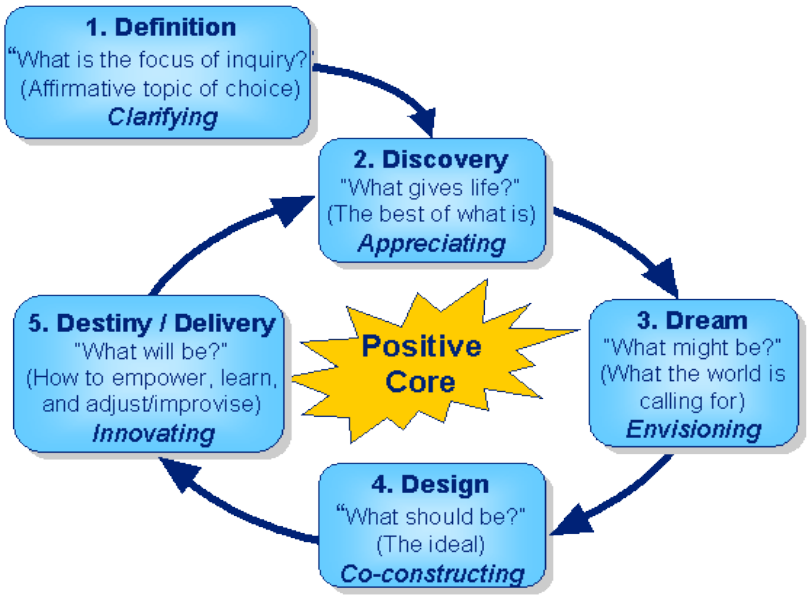


Figure 2. The 5-D Cycle of Appreciative Inquiry

(http://www.metavolution.com/rsrc/articles/whatis_ai.htm)

Further information:

- MindTools Appreciative inquiry http://www.mindtools.com/pages/article/newTMC_85.htm
- Center for Appreciative Inquiry http://www.centerforappreciativeinquiry.net/

Best practices and worst cases in knowledge creation and sharing

Best practices can be defined as "practices that consistently show results superior to those achieved with other means". (European Commission report on best practices p.17) Best practice examples can be used as a support and example during the training session.

Further information:

- The webpage to European Commission best practices http://ec.europa.eu/dgs/secretariat_general/admin_burden/best_practice_report/best_practice_report_en.htm
- Case studies on Cradle to Cradle® http://www.epea-hamburg.org/en/case-studies
- European Small Business Portal, Success stories http://ec.europa.eu/small-business/success-stories/index_en.htm

Worst cases can be defined as "worst possible environment or outcome out of the several possibilities in planning or simulation" (BusinessDictionary.com). During the training session worst cases can be helpful to the participants in order to help their planning of the future

expenditure cuts and contingency in their businesses. Unfortunately, examples from the worst cases are not easily found.

Experiences from a real working life and companies should be included in the training programmes. Sharing knowledge and experiences with the companies highlights well the current situation with. During group activities possible solutions for the acute changes could be developed.

Further information:

Link behind the definition: http://www.businessdictionary.com/definition/worst-case-scenario.html

Creativity and innovations

Creativity and innovations are closely related to the productivity in SMEs. European Commission promotes innovations in SMEs, like technological breakthroughs, new processes and business models, non-technological innovations and innovation in the services sector. Creativity, use of new knowledge and capturing tacit knowledge will strengthen productivity of SMEs. When knowledge is transferred effectively, new product, process and service innovations have a change to be invented.

Further information:

- European small business portal has gathered together all the information provided by the EU for SMEs, ranging from practical advice to policy issues. http://ec.europa.eu/small-business/index_en.htm
- European Commission, Innovations http://ec.europa.eu/growth/industry/innovation/index_en.htm
- European Commission, Innovation Union http://ec.europa.eu/research/innovation-union/index_en.cfm
- European Commission, Entrepreneurship and Small and medium-sized enterprises (SMEs) http://ec.europa.eu/growth/smes/index_en.htm
- MindTools Creativity tools http://www.mindtools.com/pages/main/newMN_CT.htm

4. Official examination regulations

The following examination regulations were adopted in German by the Vocational Training Committee of the Schwerin Chamber of Skilled Crafts in March 2023 and by the General Assembly of the Schwerin Chamber of Skilled Crafts in May 2023 and subsequently approved by the Ministry of Education of the State of Mecklenburg-Vorpommern and then published in the journal Nord Handwerk. The examination regulations, of which an English translation is also attached below, have thus entered into force.

A procedure for the international recognition of the official further education qualification at EQF Level 5 was also developed, discussed and agreed.

Examination Regulation

Rechtsvorschriften für die Fortbildungsprüfung zur Fachkraft für Digitalisierung und Zusammenarbeit im Bauwesen (HWK) nach § 42a HwO

Die Handwerkskammer Schwerin erlässt aufgrund der Beschlüsse des Berufsbildungsausschusses vom ..... 2023 und der Vollversammlung vom ..... 2023 gemäß des § 42 a der Handwerksordnung (HwO) in der Fassung der Bekanntmachung der Neufassung vom 24.09.1998 (BGBl. I S. 3074; 2006 I S. 2095) zuletzt geändert am 31.08.2015 (BGBl. I S. 1474) folgende besonderen Rechtsvorschriften für die Fortbildungsprüfung zur Fachkraft für Digitalisierung und Zusammenarbeit im Bauwesen (HWK).

§ 1 Ziel der Prüfung und Bezeichnung des Abschlusses

1) Durch die Prüfung zur Fachkraft für Digitalisierung und Zusammenarbeit im Bauwesen (HWK) ist festzustellen, ob der Prüfling die notwendigen Kenntnisse, Fähigkeiten und Erfahrungen besitzt, digitale Technologien in kleinen und mittleren Unternehmen des Bau- und Ausbaugewerbes in handwerklich orientierten Funktionsbereichen sachgerecht einzusetzen.

2) Die erfolgreich abgelegte Prüfung führt zum anerkannten Abschluss Fachkraft für Digitalisierung und Zusammenarbeit im Bauwesen (HWK).

§ 2 Zulassungsvoraussetzungen

Zur Prüfung ist zuzulassen, wer

1) eine mit Erfolg abgelegte Ausbildungsprüfung in einem Beruf des Bau- und Ausbaugewerbes nachweist und über mindestens fünfjährige einschlägige berufliche Erfahrungen verfügt.

2) ein mit Erfolg abgeschlossenes einschlägiges Hochschulstudium nachweist.

3) Abweichend von Absatz 1 und 2 kann zur Prüfung auch zugelassen werden, wer durch Vorlage von Zeugnissen oder auf andere Weise glaubhaft macht, dass auf Grund der bisherigen Tätigkeit Kenntnisse, Fähigkeiten und Erfahrungen erworben worden sind, die eine Zulassung zur Prüfung rechtfertigen.

§ 3 Gliederung, Inhalt und Dauer der Prüfung

1) Theoretische Grundlagen

Im ersten Prüfungsteil sind Grundkenntnisse in folgenden Handlungsfeldern nachzuweisen:

a) Analyse der Realisierungspotenziale für inner- und zwischenbetriebliche Kooperationen im Bauwesen unter Nutzung digitaler Technologien und Tools

b) Analyse der Einsatzmöglichkeiten digitaler Technologien in der Ausführung von Neubau-, Ausbau-, Modernisierung-, Sanierungs- und Renovierungsarbeiten

c) Unterbreitung betriebswirtschaftlich begründeter Vorschläge zur Nutzung von Bau Kooperationsmodellen und von digitalen Technologien

d) Prüfung der betrieblichen Eignung zur Realisierung von Bau-Kooperationsmodellen und zur Nutzung von digitalen Bau-Technologien

e) Entwicklung von Optimierungsvorschlägen zur Verbesserung der inner- und zwischenbetrieblichen Kooperationen im Bauwesen unter Nutzung digitaler Technologien und zur Nutzung von digitalen Bau-Technologien

f)Analyse und Beurteilung der Kommunikations-, Kooperations- und Problemlösungskompetenz

Der erste Teil der Prüfung wird mündlich durchgeführt und soll insgesamt nicht länger als 30 Minuten dauern.

2) Planung, Realisierung und Bewertung von Kooperationen und des Einsatzes digitaler Bau-Technologien

Im zweiten Prüfungsteil soll der Prüfling nachweisen, dass er in der Lage ist, Kooperationsmodelle, Tools und digitale Bautechnologien für betriebsbezogene Arbeiten im Bau- und Ausbaubereich auszuwählen, einzusetzen und zu evaluieren. Dazu gehören:

a) das Aufzeigen von Aktionsfeldern für die Nutzung von Kooperations-Modellen und -Tools sowie digitaler Bau-Technologien in KMU

b) die Entwicklung von Interaktion, Austausch, Engagement und Zusammenarbeit mittels digitaler Technologien

c) die Planung des Einsatzes von Kooperationsmodellen und digitaler Bau-Technologien im Betrieb

d) die Darstellung von Vor- und Nachteilen bei der Realisierung von Kooperationen und der Nutzung digitaler Bau-Technologien im Betrieb

e) die Klärung sämtlicher Voraussetzungen zur Realisierung von Bau-Kooperationen und Nutzung digitaler Bau-Technologien im Betrieb

f) die Realisierung von Kooperationen und Verankerung des Einsatzes digitaler Bau-Technologien im Betrieb

g) Maßnahmen zur Überprüfung der Geeignetheit von Kooperations-Modellen und -Tools sowie von digitalen Bau-Technologien im Betrieb

h) Ermittlung von Bedürfnissen, kreativer Gebrauch von digitalen Technologien und Identifizierung digitaler Kompetenzlücken

Der zweite Teil der Prüfung wird schriftlich durchgeführt und soll 60 Minuten nicht überschreiten.

3) Projektarbeit

Der dritte Prüfungsteil erfolgt in Form der Durchführung eines Entwicklungsprojektes zum Einsatz von Kooperationsmodellen und/oder digitaler Technologien im Unternehmen. Entwicklung, Durchführung und Ergebnisse des Entwicklungsprojektes sind schriftlich zu dokumentieren. Das Entwicklungsprojekt wird vom Prüfling vorgeschlagen und muss vom Prüfungsausschuss, der auch Umfang, Beginn und Dauer der Projektarbeit festlegt, genehmigt werden. Die Bearbeitungszeit im Unternehmen soll sich mindestens über zwei Monate erstrecken.

4) Auf der Grundlage der Prüfungsleistungen in der Projektarbeit ist ein Fachgespräch zu führen, indem der Prüfling zeigen soll, dass er die der Projektarbeit zugrunde liegenden fachlichen Zusammenhänge aufzeigen, den Ablauf der Projektarbeit begründen und mit der Projektarbeit verbundene fachliche Probleme und deren Lösungen darstellen kann. Das Fachgespräch soll nicht länger als 30 Minuten dauern.

§ 4 Anrechnung anderer Prüfungsleistungen

1) Von der Ablegung der Prüfung in einzelnen Handlungsfeldern kann der Prüfling auf Antrag von der Handwerkskammer befreit werden, wenn er/sie vor einer zuständigen Stelle, einer öffentlichen oder staatlichen anerkannten Bildungseinrichtung oder vor einem staatlichen Prüfungsausschuss eine Prüfung bestanden hat, deren Inhalt den Anforderungen des jeweiligen Handlungsfeldes entspricht.

2) Eine vollständige Freistellung ist nicht zulässig.

§ 5 Bestehen der Prüfung und mündliche Ergänzungsprüfung

1) Die Prüfungsleistungen in den Prüfungsteilen gem. § 3 sind einzeln zu bewerten.

2) Die in den drei Prüfungsteilen erzielten Punktzahlen in den mündlichen und schriftlichen Prüfungsleistungen sind zu einer Gesamtpunktzahl zusammenzufassen. Dabei besteht die Gesamtnote zu

15 % aus dem ersten Prüfungsteil,

25 % aus der schriftlichen Prüfung des zweiten Prüfungsteils,

40 % aus der Projektarbeit des dritten Prüfungsteils und

20 % aus dem Fachgespräch im dritten Prüfungsteil.

3) Die schriftliche Prüfung des zweiten Prüfungsteils ist durch eine mündliche Prüfung zu ergänzen, wenn diese für das Bestehen der Prüfung den Ausschlag geben kann. Die mündliche Prüfung soll nicht länger als 15 Minuten pro Prüfung dauern.

4) Die Prüfung ist bestanden, wenn in jedem Prüfungsteil mindestens ausreichende Leistungen erbracht worden sind.

5) Über das Bestehen der Prüfung ist ein Zeugnis auszustellen, aus dem die Prüfungsgesamtnote hervorgehen muss.

§ 6 Wiederholung der Prüfung

1) Eine Prüfung, die nicht bestanden wurde, kann zweimal wiederholt werden.

2) Hat der Prüfling bei nicht bestandener Prüfung in einzelnen Prüfungsteilen gemäß § 3 mindestens ausreichende Prüfungsleistungen erbracht, so ist diese Prüfungsleistung auf Antrag nicht zu wiederholen, sofern sich der Prüfling innerhalb von zwei Jahren, gerechnet vom Tage der Feststellung des Ergebnisses der nicht bestandenen Prüfung, zur Wiederholungsprüfung angemeldet hat. Die Bewertung der Prüfungsleistung ist im Rahmen der Wiederholungsprüfung zu übernehmen.

§ 7 Anwendung anderer Vorschriften

Soweit diese Rechtsvorschriften keine abweichende Regelung enthalten, ist die Prüfungsordnung für die Durchführung von Fortbildungsprüfungen im Bereich des Berufsbildungsgesetzes der Handwerkskammer Schwerin in der jeweils gültigen Fassung anzuwenden.

§ 8 Inkrafttreten

Diese Rechtsvorschriften treten mit ihrer Bekanntmachung im Amtlichen Mitteilungsblatt der Handwerkskammer Schwerin (Nordhandwerk) und ihrer Veröffentlichung auf der Homepage www.hwk-schwerin.de unter der Rubrik „Rechtsgrundlagen“ in Kraft.

Legal provisions for the advanced training examination as a specialist for digitization and cooperation in the construction industry (HWK) according to § 42a HwO

On the basis of the decisions of the Vocational Training Committee of ..... 2023 and the General Assembly of ..... 2023 according to § 42 a of the Crafts Code (HwO) in the version of the announcement of the new version of 24.09.1998 (Federal Law Gazette I p. 3074; 2006 I p. 2095) last amended on 31.08.2015 (Federal Law Gazette I p. 1474) the following special legal provisions for the advanced training examination for digitization and cooperation in the construction industry (HWK).

§ 1 Objective of the audit and description of the financial statements

1) The examination as a specialist for digitization and cooperation in the construction industry (HWK) determines whether the examinee has the necessary knowledge, skills and experience to use digital technologies appropriately in small and medium-sized enterprises in the construction and finishing industry in craft-oriented functional areas.

2) The successfully passed examination leads to the recognized degree Of Specialist for Digitization and Cooperation in the Construction Industry (HWK).

§ 2 Admission requirements

For the examination, it must be allowed who:

1) proves a successfully passed training examination in a profession in the construction and finishing industry and has at least five years of relevant professional experience.

2) proves a successfully completed relevant university degree.

3) By way of derogation from paragraphs 1 and 2, any person who demonstrates, by means of certificates or by other means, that knowledge, skills and experience have been acquired on the basis of the previous activity which justify admission to the examination may also be admitted to the examination.

§ 3 Structure, content and duration of the examination

1) Theoretical foundations

In the first part of the examination, basic knowledge in the following fields of action must be demonstrated:

a) Analysis of the implementation potential for internal and inter-company cooperation in the construction industry using digital technologies and tools

b) Analysis of the possible applications of digital technologies in the execution of new construction, expansion, modernization- restauration- and renovation work

c) Making business-based proposals for the use of construction cooperation models and digital technologies

d) Examination of operational suitability for the implementation of construction cooperation models and for the use of digital construction technologies

e) Development of optimization proposals to improve internal and inter-company cooperation in the construction industry using digital technologies and for the use of digital construction technologies

f) Analysis and assessment of communication, cooperation and problem-solving skills

The first part of the exam will be conducted orally and should not last more than 30 minutes in total.

2) Planning, implementation and evaluation of cooperations and the use of digital construction technologies

In the second part of the examination, the examinee should prove that he is able to select, use and evaluate cooperation models, tools and digital construction technologies for operation-related work in the construction and expansion sector. These include:

a) the identification of fields of action for the use of cooperation models and tools as well as digital construction technologies in SMEs

b) the development of interaction, exchange, engagement and collaboration through digital technologies

c) the planning of the use of cooperation models and digital construction technologies in operation

d) the presentation of advantages and disadvantages in the realization of cooperations and the use of digital construction technologies in operation

e) the clarification of all prerequisites for the realization of construction cooperations and the use of digital construction technologies in operation

f) the realization of cooperations and anchoring of the use of digital construction technologies in the company

g) measures to verify the appropriateness of cooperation models and tools as well as digital construction technologies in operation

h) identification of needs, creative use of digital technologies and identification of digital skills gaps

The second part of the exam is conducted in writing and should not exceed 60 minutes.

3) Project work

The third part of the examination takes the form of the implementation of a development project for the use of cooperation models and/or digital technologies in the company. The development, implementation and results of the development project must be documented in writing. The development project is proposed by the examinee and must be approved by the audit committee, which also determines the scope, start and duration of the project work. The processing time in the company should extend over at least two months.

4) On the basis of the examination achievements in the project work, a technical discussion is to be conducted in which the examinee is to show that he can show the technical relationships underlying the project work, justify the course of the project work and present technical problems associated with the project work and their solutions. The expert discussion should not last longer than 30 minutes.

§ 4 Crediting of other audit services

1) Upon request, the examinee may be exempted from taking the examination in individual fields of action by the Chamber of Crafts if he/she has passed an examination before a competent authority, a public or state recognized educational institution or before a state examination board, the content of which meets the requirements of the respective field of action.

2) A complete exemption is not permitted.

§ 5 Passing the examination and oral supplementary examination

1) The examination performance in the examination parts according to § 3 must be evaluated individually.

2) The scores achieved in the three parts of the examination in the oral and written examinations must be combined into a total number of points. The overall grade is too

15 % from the first part of the examination,

25 % from the written examination of the second part of the examination,

40 % from the project work of the third part of the examination and

20 % from the expert discussion in the third part of the examination.

3) The written examination of the second part of the examination must be supplemented by an oral examination if this can be decisive for passing the examination. The oral exam should not last longer than 15 minutes per exam.

4) The examination is passed if at least sufficient performance has been achieved in each part of the examination.

5) A certificate must be issued stating the passing of the examination, from which the overall examination grade must be shown.

§ 6 Repetition of the examination

1) An exam that has not been passed can be repeated twice.

2) If the examinee has completed at least sufficient examination performance in individual parts of the examination in accordance with § 3 in the event of a failed examination, this examination performance shall not be repeated on request, provided that the examinee has registered for the repeat examination within two years, calculated from the date of determination of the result of the failed examination. The assessment of the examination performance is to be taken over as part of the repeat examination.

§ 7 Application of other provisions

Insofar as these legal provisions do not contain any deviating regulations, the examination regulations for the conduct of further training examinations in the area of the Vocational Training Act of the Schwerin Chamber of Skilled Crafts in the currently valid version shall apply.

§ 8 Entry into force

These legal provisions enter into force with their publication in the Official Gazette of the Chamber of Crafts Schwerin (Nordhandwerk) and their publication on the homepage www.hwk-schwerin.de under the heading "Legal bases".

Evaluation in the Qualification Framework and international recognition

A qualifications framework for the Baltic Sea Region was designed under the Project Leonardo “Baltic Education”[8]. By means of the European Credit Transfer System of Vocational Education and Training (ECVET), this “BSR-QF” provided the basis for the evaluation of two craft occupations – “carpenter” and “painter”. ECVET is a system which allows to characterize qualification (knowledge, skills and competence) by transferable and accumulable learning units and to assign credit points to the learning outcomes. The BSR-QF and the applied ECVET process

[8] Hanseatic Parliament: Baltic education, Hamburg 2008

for the two named occupations formed the basis for the evaluation of the three advanced training programmes developed "Workplace Innovation".

EQF and BSR-QF – an introduction

The Maastricht Declaration of 2004, the Lisbon Strategy of 2000 as well as several other European Union initiatives, and in this context specifically dedicated funding to raise the geographical and labour market mobility and to promote lifelong learning, will yield increased employment and economic growth across EU countries. Rapid social, technological and economic changes along with an aging society make lifelong learning a necessity. For that reason, education is a major component to meet and to achieve the ambitious Lisbon goals. Hence, the European Commission has induced to develop a European Qualifications Framework and to establish National Qualifications Frameworks (hereinafter: NQF) by 2010. The modelling of National Qualifications Frameworks lies in the competence of national authorities, whereas the EU-Commission has recommended that the EU Member States implement NQFs. The European Qualifications Framework represents a meta-framework and is considered by the European Commission as crucial in meeting European objectives, set out in the Lisbon Strategy.

The main purpose of a qualifications framework is to improve transparency, quality and comparability of professional and academic qualification levels across differing education systems and European countries. The EQF itself does not constitute a formal recognition of occupational qualifications. A special feature of Europe is the enormous diversity of educational systems. A prerequisite to make this specificity an asset is to foster transparency.

Transparency can be considered as a fundamental prerequisite for the recognition of qualifications, and it improves comparability. Better comparability between countries is a decisive element to increase labour mobility and to ensure permeability of qualifications, whereby permeability constitutes a prerequisite for lifelong learning.

In the near future, qualifications frameworks must meet these criteria with concrete and well-designed concepts. A qualifications framework is an appropriate tool for the development and for classifying qualifications. The European Qualifications Framework was adopted in November 2007.

Under the project “Baltic Education”, constructive and fruitful discussions at European and national levels should be encouraged by a “Baltic Sea Region Qualifications Framework” (hereinafter: BSR-QF). This BSR-QF should be regarded as a supplement and contribution to the ongoing debate rather than a substitute for the shaping of National Qualifications Frameworks. The project “Baltic Education” has delivered a sizeable contribution to this strategy.

The Baltic Sea Region (BSR) is an area with a considerable number of different countries. These countries share common problems as they endeavour to cope with the same economic and demographic challenges and concerns. It is essential for this region to further develop vocational training, to improve quality and to establish transparency and recognition models. To solve these complex issues, the BSR-QF provides an orientation, allowing for classifications across the whole qualification range and also serving as a common ground for constructive discussions, conceptual considerations and individual progress.

The Baltic Sea Region Qualifications Framework

The BSR-QF comprises eight qualification levels that take into account acquired skills from the European Higher Education Area (EHEA) plus vocational qualifications and competences.

This concept is consistent with the recommendations of the European Commission. Table 1 shows the elaborated proposal for the BSR-QF. The following presents a brief overview of the respective competence levels of the BSR-QF. The following section provides more detailed information on the methodology and descriptors that have been developed and used for the BSR-QF.

Competence level 1 – Basic education

Skills profiles to be reached at this stage are general basic training skills and they will not be counted to vocational training or academic education. Basic training is a prerequisite to gain access to higher qualification levels. The development of learning skills still requires resolute continued guided support. It is not possible to assign this skills level to a specific domain. Therefore, qualifications in this level are domain independent.

Competence level 2 – No vocational training

Level 2 comprises the first level of vocational training (VET area). Qualifications at this stage are not specifically pronounced, since knowledge and skills are at an early stage of evolving. Methods and social skills are not yet domain-specific. 1 to 2-year qualification programmes, training phases and vocational training preparation phases are covered by this stage.

Tab.1: Baltic Sea Region-Qualifications Framework

Level	Education Degree	Framework for Qualification of the VET* area and EHEA**
1	*Basic Education*	-
2	*No Vocational Graduation* graduation/training after/for 1-2 years, and work and apprenticeship preparation phase (at the age of 15/16)	First cycle VET area
3	*Lower Vocational Graduation* certificate of apprenticeship (in 2-4 years), and no/limited professional or experience (certificate of apprenticeship + <5 years of profession experience)	Second cycle VET area
4	*Middle Vocational Graduation* long profession experience as skilled worker (certificate of apprenticeship + ≥5 years of profession experience); comprehensive further education; “young master craftsman” with no/limited professional experiences (<3 years of profession experience)	Third cycle VET area

Level	Education Degree	Framework for Qualification of the VET* area and EHEA**
5	*Upper Vocational Graduation* master craftsman with long profession experiences as master (≥3 years); "master craftsman plus"; long profession experiences and further education (certificate of apprenticeship + ≥8 years of profession experience); introductory study period	Fourth cycle VET area and short cycle academic area
6	Bachelor (academic bachelor's degree) and other similar qualifications and competences	Fifth cycle VET area and first cycle academic area
7	Master (academic master's degree) and other high qualifications and competences	Sixth cycle VET area and second cycle academic area
8	PhD and other very high qualifications and competences	Seventh cycle VET area and third cycle academic area

Competence level 3 – Lower vocational training

Level 3 covers complete vocational training from a training period of 2 to 4 years. Access to the competence level of a lower vocational training is possible after completion of a secondary school or after reaching the competence level 2. This involves professional skills, equivalent with an expertise level of an initial vocational training. The graduate has no or limited work experience. Qualifications at this level include a broad general education and an initial job specific expertise. Therefore, only specific parts of a domain will be covered in this qualification level. Completion of the skill level 3 is a precondition for achieving the competence levels 4 and 5.

Competence level 4 – Intermediate vocational education

Compared to Level 3, this level specifies a higher degree of professional and technical expertise. Vocational training qualifications, extensive advanced training, "Young master craftsman", and long work experience are covered by this stage. The level in this field is relatively high and all parts of a professional domain are covered. Level 4 qualifications indicate great job specific knowledge and skills. In this level, a person can be regarded as a specialist who has the knowledge and skills to relatively independently solve problems. Finally, achieving level 4 along with extensive advanced training, allows a limited number of candidates with ambitious and superb qualifications to access an academic bachelor level, without having previously obtained a general qualification for university entrance.

Competence level 5 – Higher vocational education

At this stage, candidates already have a formal vocational qualification as a master craftsman, including follow-up trainings; they have long professional experience and thus a high degree of technical expertise. Each part of a domain is covered at a high level, but without scientific

expertise. Knowledge acquired by candidates at this competence level comprise autonomous learning, broad theoretical and practical knowledge. At this relatively high level of competence basic academic studies are touched upon. Completing of the competence level 5 with comprehensive, previous vocational education and further training (e.g. as "Master Craftsman Plus") gives access to competence level 6, without having a general qualification for university entrance. It is possible to obtain credits for university entrance, based upon previously acquired knowledge (maximum 120 credit points). Nevertheless, persons who seek access to the bachelor level, have to pass an individual interview. Competence level 5 covers the short academic cycle with regard to the European Higher Education Area (EHEA). University students with circa 120 credit points are within competence level 5. [9]

Competence level 6 – Bachelor and other comparable education and skills

Candidates within this qualification range have already completed the first cycle of the EHR and the 5th level of vocational training. The academic bachelor's degree is obtained by students who usually scored 180-240 credit points[10]. Level 6 qualifications feature advanced theoretical knowledge and skills. This also applies to individuals with completed vocational training and notably domain-oriented knowledge. Precondition for access to the competence level 6 is the general qualification for university entrance or similar sophisticated competences and skills within a domain-specific education. Completing the qualification levels 4 and 5 also opens up access to the competence level 6.

Competence level 7 – Master and other higher qualification and skills

Having an outstanding domain-specific knowledge, candidates are at a significantly high level within this stage. They are highly qualified professionals, with advanced training and skills in a most deeply specific domain. Qualifications at this level include self-determined and theoretical learning. The master's degree is one of the conditions for reaching the third level of the academic cycle. Competence Level 7 is the second highest qualification of the EHR and the second highest level of the vocational training cycle.

Competence level 8 – PhD and other first-rate qualifications and skills

A PhD title is one of the highest academic degrees and it is the highest level within the EHR system. An academic person at this proficiency level is a professional and expert. Competence level 8 is the highest vocational training cycle to be reached by individuals. These persons have outstanding expertise and intellectual abilities in a most highly specific domain field. Persons at qualification level 8 have leadership skills and experience as well as potential for critical, methodical analyses, assessments and presentations.

Methodology and Descriptors

The proficiency levels measure professional, personal skills, abilities and competences within a specific domain. It is a method to classify and assess qualifications in levels. It is not the acquired

[9] cf. MINISTRY FOR SCIENCE, TECHNOLOGY, AND INNOVATION (Eds.) (2005): *A Framework for Qualifications in the European Higher Education Area.* Bologna Working Group on Qualifications Frameworks. Copenhagen.
[10] MINISTRY FOR SCIENCE, TECHNOLOGY, AND INNOVATION (Eds.) (2005): *A Framework for Qualifications in the European Higher Education Area.* Bologna Working Group on Qualifications Frameworks. Copenhagen.

diplomas but skills that are subject to assessment in levels. Qualifications are understood as a set of skills. A competence is defined as the ability to meet tough requirements in a specific context. Competent execution or effective actions involve the mobilization of expertise, cognitive and practical skills as well as social and behavioural components such as attitudes, emotions, values and motivations.[11] Skills are more than school and work-related knowledge. It is therefore a consistent argument that (professional) skills comprehensively include social and personal competence. Skills, as they are set out in the BSR-QF, are not occupation-specific, but they are in fact aggregates. [12] Hence, educational degrees were used in the project to describe, illustrate and classify skills. This increases the legitimacy among stakeholders, builds on familiar ways of thinking and classification patterns and enables easy, transparent and unbureaucratic description and understanding.

Table 2 shows the descriptors for each skills level of the BSR-QF. The descriptors "expertise" and "competence" are equivalent to the descriptors in the EQF.

The Baltic Sea Region Qualifications Framework contributes to the discussion and advisory debate on the development of the National Qualifications Framework. The design is consistent with the structures and methods of the European Commission.[13] This BSR-QF contributes to the fostering of education and the economy of the Baltic States as it presents an instrument to reduce cross-border barriers, which limit the work-related mobility and productivity dependent thereon. Accordingly, the BSR-QF has been accepted by the members of the Hanseatic Parliament in the General Assembly on 8 November 2007 in Vilnius as a substantial support and development tool. In the further work of the present project, the BSR-QF ensures orientation for grading, structuring and evaluation of individual professions.

Tab. 2: Descriptors for competence levels 1-8 (Source: Own research)

Level	Expertise*	(Methodological) Competence*	(Formal) education degree	Framework for Qualification of the VET area and EHEA

[11] D. S. RYCHEN/L. H. SALGANIK (2003): Key Competencies for a Successful Life and a Well-Functioning Society. DeSeCo Project report Summary, OECD, Paris, p. 2

[12] cf. BUNDESINSTITUT FÜR BERUFSBILDUNG (BIBB) (Eds.) (2005): *Fachlicher Prüfbericht zu den Grundbegriffen und Deskriptoren des Entwurfs für einen Europäischen Qualifikationsrahmen*. Bonn; and Hanf, Georg und Volker Rein (2005): *Towards a National Qualification Framework for Germany*. Federal Institute for Vocational Education and Training (BIBB), Bonn.

[13] cf. EUROPÄISCHE KOMMISSION (EC) (2005): *Towards a European Qualifications Framework for Lifelong Learning*. Commission Staff Working Document, SEC (2005) 957, Brussels; EUROPEAN COMMISSION (EC) (2006): *Implementing the Community Lisbon Programme. Proposal for a recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning*. COM (2006) 479 final, 2006/0163 (COD), Brussels; and Ministry of Science, Technology and Innovation (Eds.) (2005): *A Framework for Qualifications in the European Higher Education Area.* Bologna Working Group on Qualifications Frameworks, Copenhagen.

	In the BSR-QF, expertise is described as knowledge and skills (equivalent with EQF)	*In the BSR-QF, competence describes the degree of responsibility and autonomy*	*The (Formal) education degree describes the degree which can be reached by an individual*	*The framework VET area and EHEA is a modified and extended EHEA framework*
1	Basic general Education; basic skills required to carry out simple tasks	Work under direct supervision in a structured context	–	–
2	Basic factual knowledge of a field of work or study; basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	Work under direct supervision in a structured context with some autonomy	-	-
3	Knowledge of facts, principles, processes and general concepts, in a domain; a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	Take responsibility for completion of tasks in work; adapt own behaviour to circumstances in solving problems	graduation/training after/for 1-2 years, and work and apprenticeship preparation phase (at the age of 15/16)	First cycle VET First vocational training
4	Factual and theoretical knowledge in broad contexts within a domain; a range of cognitive and practical skills required to generate solution to	Exercise self-management within the guidelines of work contexts that are usually predictable, but are subject to change supervise the	Certificate of apprenticeship (in 3 - 4 years), and no/limited professional or experience (certificate of apprenticeship + < 3	Second cycle VET Complete vocational training

	specific problems in a domain	routine work of others, taking some responsibility for the evaluation and improvement of work activities	years of profession experience)	
5	Comprehensive, specialised, factual and theoretical knowledge within a domain and an awareness of the boundaries of that knowledge; a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	Exercise management and supervision in contexts of work or study activities with unpredictable change; review and develop performance of self and others	Long profession experience as skilled worker (certificate of ap-prenticeship + ≥ 5 years of profes-sion experience); comprehensive further education	Third cycle VET Experienced qualified professional
6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles; advanced skills, demonstrating mastery and innovation required to solve complex and unpredictable problems in a specialised domain	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups	Bachelor (academic bachelor's degree) and other similar qualifications and competences Master craftsman and Technician with long profession experiences as master (≥ 3 years); introductory study period	Fourth cycle VET First cycle academic area and professional Master
7	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking;	manage and transform work or study contexts that are complex, unpredictable and require new strategic	Master (academic master's degree) and other high qualifications and competences	Fifth cycle VET Second cycle academic area and Business

	critical awareness of knowledge issues in a field and at the interface between different fields; specialised problem-solving skills required in research and or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams	Master craftsman with training as a business economist in the skilled trades with long profession experiences as master (≥ 5 years); longer study period	Economist in trade
8	Knowledge at the most advanced frontier of a field of work or study and at the interface between domains; the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research.	PhD and other very high qualifications and competences	Sixth cycle VET Third cycle academic area

* European Commission (EC) (2006): Implementing the Community Lisbon Programme. Proposal for a recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning. COM (2006) 479 final, 2006/0163 (COD), Brussels.

Structuring and evaluation

The objective of the Baltic Education Project was to develop, introduce and implement a system for mutual recognition of professional qualifications. This will be achieved by using the European Credit Transfer System of Vocational Education and Training (ECVET).[14] ECVET is a system that

[14] EUROPEAN COMMISSION (EC) (2006): European Credit System for Vocational Education and Training (ECVET). A system for the transfer, accumulation and recognition of learning outcomes in Europe. SEC (2006) 1431, Brussels, p. 3

enables describing qualifications by transferable and accumulable learning units (in the form of knowledge, skills and competence) and corresponding allocated credit units.[15]

ECVET also perfectly complements the European Qualifications Framework.[16] In its guidelines, the European Commission outlined the overall concept as follows:

a) focus on learning outcomes expressed in terms of knowledge, skills and competence.

b) based on a process of qualification.

c) adapted to the demands of lifelong learning and all learning contexts, on an equal footing.

d) geared towards the mobility of people.[17]

Further ECVET consultation guidelines and regulations specify:

a) mobility of people undertaking training.

b) validation of the outcomes of lifelong learning.

c) transparency of qualifications.

d) mutual trust and cooperation between vocational training and education providers in Europe.[18]

The experience and methods of ECVET in the project “Baltic Education”, form the basis for the evaluation of the training programmes developed "Management and Technologies of Water, Wastewater, Waste and Circular Economy".

In a first step, the individual training modules are evaluated according to the principle "25 training hours = 1 credit point". Based on this starting point, in a second step the significance and content of each training module is evaluated by project partners and experts and then the credit points for each module are determined in a group evaluation.

Within the framework of the "Baltic Education" project, a procedure for the mutual international recognition of vocational education and further training qualifications was developed and agreed with all countries bordering the Baltic Sea. Following this agreement, the project developed and agreed a procedure for the recognition of qualifications from all training courses. The following procedure then follows for the recognition of the degrees of all training courses of the project.

- Lecturers/examiner rates the courses by assigning credit points.

[15] EUROPEAN COMMISSION (EC) (2006): European Credit System for Vocational Education and Training (ECVET). A system for the transfer, accumulation and recognition of learning outcomes in Europe. SEC (2006) 1431, Brussels, p. 3
[16] cf. EUROPEAN COMMISSION (EC) (2006): Implementing the Community Lisbon Programme. Proposal for a recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning. COM (2006) 479 final, 2006/0163 (COD), Brussels.
[17] EUROPEAN COMMISSION (EC) (2006): European Credit System for Vocational Education and Training (ECVET). A system for the transfer, accumulation and recognition of learning outcomes in Europe. SEC (2006) 1431, Brussels, p. 5
[18] EUROPEAN COMMISSION (EC) (2006): European Credit System for Vocational Education and Training (ECVET). A system for the transfer, accumulation and recognition of learning outcomes in Europe. SEC (2006) 1431, Brussels, p. 35

- Mutual recognition of completion in the Baltic Sea countries follows upon fulfilment of the following conditions:
  a) The final exam was passed.
  b) The assessment of the course has resulted in at least 8o % of the possible credit points shown in Tables 3 to 5 (20% margin of tolerance).
  c) Skills were acquired in all three mandatory modules
  Where they do not yet exist, each of the future participants will receive an EU education passport in which the results are documented.

In the project " Efficient construction through digital technologies in the construction and finishing trade (DIG-CON)" two trainings were developed and implemented.

A Construction-Cooperation through digital technologies and tools

B Mastering the digital Transformation in SMEs in the construction sector

In both trainings all parts are classified as mandatory, in which knowledge and skills have to be acquired.

With regard to the assignment of the course in the BSR-QF, the classification of both trainings was made in competence level 5 "Experienced qualified professional"

The assessment in the project led to the following conclusions:

Table 3: Evaluation training A "Construction-Cooperation through digital technologies and tools" by credit points system

Part	**Credit Points**
Part 1 Classroom Teaching	2.5
Part 2 Learning Project	5,5
Part 3 Reporting and Reflection	2,0
Total	10,0

Table 4: Evaluation training B "Mastering the digital Transformation in SMEs in the construction sector" by credit points system

Part	**Credit Points**
Part 1 - Educational block A	2.5
Part 2 - Learning on the job A	4,5
Part 3 - Educational block B	2,0
Part 4 - Learning on the job B	4,5
Part 5 - Reporting Day	1,5

Total	15,0

Internationally recognised educational qualification

Participants can complete training A and/or training B. Upon completion of one of the training courses and the final examination, the participants acquire the recognised professional further training qualification of "Specialist for digitalisation and cooperation in construction (HWK)".

5. Implementation Reports

Chamber of Crafts and SME in Katowice, Poland[19]

Introduction

The training is part of the WP 5 package. The development of the curriculum and the concept of teaching assessment were carried out by the DIG-CON project partner from Germany PP2 HS21. The materials prepared by the HS21 partner were largely used to prepare the scope and topics of the training. The training uses the KAIN method, which is used to put into practice the knowledge and skills gained during the training.

We conducted a digital training for the construction and finishing industry, in which the KAIN method played an important role.

We started the training on 9.01.2024 and finished it on 21.02.2024. The first two meetings were held in the CCSK conference room. The following weeks were used by the participants to implement a selected project and digital tools in their company. At the last meeting, after joint discussions on self-study, certificates of participation were handed out (attached).

The training provided at the Chamber of Crafts and Crafts was not classified in the national lifelong learning system and cannot be directly assigned to the EQF level. It is an after-school training for adults who want to expand their knowledge of how to use modern digital tools. The opportunity to take part in training on digitization in the construction industry allows you to implement new tools that make your work easier.

During the training, participants were able to see and test several digital tools used in the construction industry live. The trainer invited a company presenting the exoskeleton to a workshop and each participant could try out the device. Participants could learn about programs and applications that facilitate cooperation at various stages of construction. The presentation of certificates to the participants of the training was also positively received. The training was free of charge.

Adoption and organisation of the training

In the curriculum, the target group could be SME owners. This time, we have gathered masters of the construction industry who provide services and employees of construction and finishing companies.

Mr. Artur Ledwoń – a trainer, as a long-time entrepreneur in the construction industry, offered to participate in the training. On the part of the Chamber, we have sent a mailing to the members of the Examination Committee in the professions of the construction industry with a request to disseminate it among the masters. We also sent another mailing to the associated Guilds with a

[19] Prepared by Anna Palowska, Chamber of Crafts and SME in Katowice, Poland

request to disseminate information about the training among entrepreneurs in the construction industry.
Initially, we planned to take part in the training in December 2023, but we did not have enough willing participants. Due to the reporting deadlines and time for self-study, we started the training in January 2024. In the end, we managed to gather a group of 8 people.

Number of participants

Yes	Name	Age	Gender
1.	Dawid Przybyła	30-60	M
2.	Kuba Przybylo	30-60	M
3.	Bartłomiej Wylężek	30-60	M
4.	Jakub Głąb	30-60	M
5.	Bąska Marek	30-60	M
6.	Christopher Kocan	30-60	M
7.	Adrian Kocan	30-60	M
8.	Olivia Kęs	30-60	F

The training took place in the CCSK conference room. The first meeting took place on 9.01.2024, the next on 16.01.2024 and the last on 21.02.2024. For 5-6 weeks, the participants had time to implement the project in their workplace. Already during the first two meetings, they showed interest in the topic by asking about various issues. During the self-study, several people contacted the lecturer to discuss the matter.

The lecturer received training materials prepared by the PP2 HS21 partner, which he used as a model when preparing the presentation. He certainly took into account the realities of the construction industry in Poland. He invited a Festool representative to demonstrate the functions of the exoskeleton. He also brought digital equipment himself

The lecture was conducted by Mr. Artur Ledwoń, experienced in working with people as an entrepreneur and trainer. Since 2007, he has been associated with the construction industry as a company owner. The certified construction technician has won two championship titles. For personal and business development, he completed courses related to construction activities. Member of the Examination Committee at the Chamber of Crafts in Katowice in construction professions – supports the development of professionals, Member of the Board of the Guild – works for the promotion and development of construction craftsmanship, Member of the Construction and Building Materials Committee at the Polish Craft Association in Warsaw – enables the shaping of industry policy. He takes an active part in study visits to European cities, where he can learn about and compare construction practices in other countries. Its aim is to develop the construction industry by introducing new technologies and innovative solutions in the construction industry, promoting craftsmanship among young people, training and educating professionals, which will contribute to improving the quality of services in the construction sector. Thanks to his extensive practice, he conducts trainings based on examples and technological innovations used in Poland on the construction site.

The lecturer answered the questions put to him. The atmosphere during the training was relaxed, so the participants were not ashamed to ask questions. Interesting discussions and exchange of experiences ensued.

During the self-study phase of the company, 2 participants contacted the lecturer to obtain information about the use of drones and thermal imaging cameras. They wanted to use these devices in their work.

Participants by age, gender, education, occupation, country of origin, etc.

Yes	Name	Age	Gender		Nationality
1.	**Dawid Przybyła**	**30-60**	**M**	**Construction profession**	**Polish**
2.	**Kuba Przybylo**	**30-60**	**M**	**Construction profession**	**Polish**
3.	**Bartłomiej Wylężek**	**30-60**	**M**	**Construction profession**	**Polish**
4.	**Jakub Głąb**	**30-60**	**M**	**Construction profession**	**Polish**
5.	**Bąska Marek**	**30-60**	**M**	**Construction profession**	**Polish**
6.	**Christopher Kocan**	**30-60**	**M**	**Construction profession**	**Polish**
7.	**Adrian Kocan**	**30-60**	**M**	**Construction profession**	**Polish**
8.	**Olivia Kęs**	**30-60**	**F**	office worker	**Polish**

The participants of the training were from the sector of small and medium-sized enterprises. We are glad that we were able to gather a group and have a training.

Implementation of the training

The training took place on-site in the training room at the Chamber of Crafts. There were 3 meetings. The first two concerned the presentation of tools that the participants were later to use in their work. We devoted the last day to discussing the tested tools, discussing together and handing over certificates.

TRAINING: Digital training for the construction and finishing industry / s digital training for the*construction and finishing industry*

Subject:

1. KAIN method / *KAIN method*
2. Digital legislation and regulation
3. Harnessing digitalisation in the enterprise
4. Digitalization in the construction process (overview + tools)
5. Digitalisation on the construction site (overview + tools)

6. Digitalization in management and administration (overview + tools)

7. Project

Due to the problem with gathering a group, we had to postpone the start of the training. However, later on, the course of the training, from sending information about the possibility of taking part in the training, to the handing over of certificates, proceeded accordingly.
At the last meeting with the participants of the training, we handed out paper questionnaires. The coach also completed his survey. We also received a survey from two companies that used thermal imaging cameras and a drone.
All participants of the training received a certificate of participation, attached.

The participants of the training willingly took part in discussions: they asked questions and talked about their experiences. They were mainly entrepreneurs who had their own business and provided services. They don't always use new technologies in their daily work, so they were glad that they could listen to and see the tools that make their work faster and easier. Applications and programs were presented in such a way that the participants understood the need for them to use their activities. The atmosphere during the training was friendly, which had a good impact on the transfer of information.
There was a clear interest in the topic among the participants.
After analysing the surveys, it can be seen that the participants were satisfied with the place, time and schedule of the meeting. The subject matter of the meeting was interesting, up-to-date, close to their needs and important to the audience. The lecturer was a professional in his industry, had up-to-date knowledge and touched on important topics, and the way the training was conducted was interesting, there was time for conversations, he presented topics in a clear way. The time allotted for self-study was adequate.

Main findings and conclusions

With this training it was difficult to gather a group. That is why we are glad that the training finally took place. After the first meeting, the interest and positive reception of the participants was visible. The invitation from Festool to try out the modern equipment was an additional highlight of the training. We were able to convey the intended training program.

A strong point of the training was the opportunity to check and test the equipment used in the construction industry and the presence of a representative from Festool. The training room and its equipment were well received. The refreshments prepared for the guests were a nice touch. The opportunity to discuss various issues and the time allocated for this was needed to keep the atmosphere at the training open.

The curriculum and the proposed materials for the preparation of the training were adequate. In our opinion, the method and preparation of the training was adequate.

The construction industry is a part of our Chamber due to the fact that the apprentice and master craftsmen exams take the exams and the members of the Examination Committees of this industry. Mr. Artur Ledwoń as a lecturer is willing to conduct trainings. It is worth taking this type of training among young people so that they can get acquainted with modern technologies in the construction industry. It's also a good idea to encourage older entrepreneurs (50+) so they can see how the industry has changed.

Reports on the implementation of a specific development project

Thermal imaging camera – Report

During the testing period of various tools as part of the training, we initially considered purchasing an exoskeleton from Festool, but due to the high price of the equipment, we decided against it. In the end, we decided to buy a thermal imaging camera. Thermal imaging cameras are devices that can detect temperature differences of various surfaces and present them in the form of visualizations. In connection with the general construction works carried out by us, which also include the installation of underfloor heating, the use of a thermal imaging camera in this aspect turned out to be very useful. With the help of thermal imaging cameras, on our construction sites, after flooding the underfloor heating with screeds, we have the ability to inspect whether the underfloor heating has been made in the right way, and in the event of problems at the customer's site in connection with the installation, we are able to quickly find leaks. The device itself is easy to use, especially since it has properly described user manuals. In connection with the further use of the device, in the near future we are thinking about introducing a building inspection service in connection with the thermal bridges in buildings leading to energy losses.

Drones – Report

In connection with the training, a drone was purchased in the company. The main purpose of the testing was to improve the speed and accuracy of inspections of buildings carried out by our company. Thanks to the recording function, we have a video of each inspection carried out on the construction site, which makes it easier to identify potential problems on the construction site and improves project management. In addition, we can see the progress of construction works in an ongoing period of time, and we can use fragments of the inspections carried out to create advertisements for investments carried out by our company. The introduced drone has been very positively received in the company. Our employees have easily acquired the skills to operate this device, and thanks to the online videos on how to use the drone, they can improve their skills at no additional cost. Due to the positive reception of the device in the company, a decision was made to purchase another drone additionally equipped with a thermal imaging camera, which will be used to inspect the facilities already built in terms of properly performed thermal insulation of the building.

Attachments

- Signed list of participants

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  https://ir.katowice.pl/wp-content/uploads/2024/02/list-1601.pdf
  https://ir.katowice.pl/wp-content/uploads/2024/02/list-2102.pdf

- All diplomas, certificates, certificates

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Ipartestületek Országos Szövetsége, Hungary[20]

Introduction

This training was included in the WP5 package, many thematic elements of this training were developed by the Buxtehude University of Applied Sciences (HS21), project partner number PP2, and we tried to take it into account as much as possible when we implemented our training. Although our training has now mainly involved micro and small businesses, this training is also suitable for larger companies in terms of providing them with digital skills for the construction and finishing trades with special regard the results of R1 „Best practices digital technologies and trainings“.

We organized this training mostly for entrepreneurs operating in construction and finishing trades, from where the most diverse professions were present, since this topic affects many different professions from carpenters or painters til electricians, both small and large businesses. The IPOSZ consistently advocated that general knowledge should be combined with the specific needs of different professions, so we had to make a programme best fitted to their needs. Doing so we focused on the “Best practices of digital technologies and training” and on the following main topics. 1. Basic digital knowledge of bidding for construction contractors. 2. Survey of customer needs using digital tools. 3. Digital documentation of extracted data and information. 4. Visual design, 3D engineering plans that are transparent and interpretable by customers.

The training was complemented by a learning on the job phase and also helped us to formulate the directions of a more comprehensive counselling system.

We delivered all the professional materials, and the collection of best practices prepared by the project partners to our member companies operating in the construction industry. The experiences and the training materials provided by the project partners were widely discussed with the membership of IPOSZ, as well as with professionals involved in the sector. As a result of this dialogue, a training material consisting of 3 main chapters was created by IPOSZ, which was taught at the training days described below.

The timing of the training courses was adapted to the economic activities of the participants. We held our first two-afternoon long meetings on 20th and 27th of November in 2023. During the organization of this training, the demand arose from our members that not everyone could attend the training days in person due to the distance, so they asked us to hold an hibrid training day as well, which took place on 27 November. However, our experience was that the hybrid form does not work for this type of training, so we only tried it once. Than the individual coaching period started with the participating companies. During the coaching process, the trainers visited all companies in person, as well as consulted with all companies several times online. After a certain period of the coaching process, we held another educational day on 06 March 2024. It was

[20] Prepared by Tamás Rettich. Hungarian Association of Craftmen's Corporation

followed by the second learning on the job phase. We held two reporting day sessions in person on 08 May and 13 May 2024. On both occasions, the mentored businesses presented their results achieved during coaching. These results will be summarized later in this implementation report on the companies' progress.

The training fits into the overall adult-education phase of the national system of training, but a direct EQF level cannot be classified to it. It is an out-of-school training takes place at the member organizations of IPOSZ and organised by IPOSZ.

This training perfectly explained the basics of the digital solutions that could help SME owners, entrepreneurs operating in construction and finishing trades. Everyone managed to acquire new skills and new knowledge, which are necessary for the exchange of information, data storage and continuous feedback of customer needs during the construction process. The construction industry is currently one of the most dynamic sectors of the economy, and the governmental measures and society's attention have recently been increasingly focused on this sector. Newly built apartments must meet new certifications and, above all, new energy requirements, so it is extremely important that both employers and employees in the construction industry should be aware of the changes and be able to apply the new IT tools and technologies in practice.

The knowledge presented at the training was implemented in detail during the coaching process tailored to the companies' needs. The topics used in the training could be used of course also in the training of enterprises of other sizes. This training is valuable not only for micro-enterprises, but also for medium-sized enterprises. It should be emphasized that the training has elements that can be used to develop certain basic skills among the whole population and thus help to develop a better digitalized relationship between businesses and consumers. The success of this training also proves that there is a significant demand for practice-oriented training.

Special features of the implementation

Digitization in the second decade of the 21th century accelerated and took such concrete forms that coexistence with it must be thought through in all areas of life, including the construction industry too. This applies to all individuals and businesses, whose everyday communication the digitalization impacts more and more widely. Regardless of the size of the company, no one can be exempt from the effects of the changes, whether they are employees or employers. Everyone must learn new skills and new knowledge if they want to participate in information exchange, data storage and all other activities that affect the life of construction companies.

1.67% of companies operating in the Hungarian construction industry are medium enterprises, 5.52% are small enterprises and 92.3% are micro enterprises. And of this 92.3%, 90% are companies with less than 4 people.

The main target group of the training was micro-enterprises, as IPOSZ's members mainly come from this sector.

For them, the acquisition of digitalization skills is important, on the one hand, for the construction industry services that they provide directly to the population. In addition, perhaps even more emphatically, the acquisition of digital knowledge is important for them when they develop

subcontracting and supplier activities and various economic collaborations with large companies and service networks. This can only be done with high-level digital knowledge in the construction industry.

Thus, it is in the fundamental interest of micro-enterprises operating in the construction industry to develop their digital skills.

Micro-enterprises mainly operate in a specific business area. But it is also extremely important for them to be able to expand beyond their usual customer base, using the latest technologies.

It is also important to deal with them, because their role is crucial in providing services, where the biggest workforce problems exist today.

One of the most effective answers to these challenges is further training of enterprises. In view of the current situation of the labour market, further training should also reach the population over 40 years, which age group is currently the most burdened in carrying out existing construction tasks, apparently has a lot of work to do, so it is difficult to convince them that in 5-10 years' time-frame they as service provider may disappear from the market, if the company does not make advance in the field of acquiring digital skills and will not have employees who are also open to lifelong learning/training in the field of digitalisation.

Of course, micro-enterprises have special training needs. These specific needs must be fully taken into account if we want to successfully transfer modern digital knowledge to them. In the field of the construction industry, special attention must also be paid to the timing of training courses. For example, it is clear that it is not worth organizing training for them in the summer, during the biggest construction works take place.

Such short-term training courses as we provided in this project must be strengthened in adult education. The experience of this project could help making decision-makers aware of the need to finance similar short-term additional trainings for micro companies.

The purpose of the training was to shape the attitude of domestic construction contractors, to strengthen their commitment to digital transformation, by expanding and deepening their necessary basic knowledge of digitalization.

Admission and organisation of the training

The training aimed at micro and small businesses, with the aim of revealing the current state of their digital maturity, as well as providing them with first-hand information about the areas to be developed in the field of digital innovations of the construction industry.

A big advantage of the course was that, although the businesses were small, they covered a very wide spectrum of the construction sector. This helped to crystallize the general elements of digitalization, which can then be used for a wide variety of construction professions and of course supplemented with professional specifics. During the selection, we also focused on broadening the range of women's businesses among the participants, although it can still be said today that mainly men are active in the construction industry, but for example, women are already predominantly active in interior design.

When inviting the training applicants, we assumed that the participants can handle their smartphones and laptops at an everyday users skill level, and that the participants would rather use the free of charge consumer applications and services.

We started from the assumption that after getting to know the simpler tools, it will be more appropriate to explore the more complex applications.

We are convinced that if we are not able to address the many thousands of family and micro businesses on a wider scale in time with appropriate training, then an employment crisis may arise, as they will not be able to perform their construction work at a high level. Digitization is bringing new devices and technical solutions to the market and into the hands of wide circles of the population. The repairing, programming, and operation of these new devices require new knowledge. There are signs that problems are already starting to appear in this area due to the lack of professionals. Therefore, training in this direction, such as those implemented in our present project, can contribute to the prevention of problems in the field of employment. These types of trainings help to avoid or reduce the occurrence of employment crisis situations.

For all these reasons, we implemented this training in a less developed region of the country, so that the businesses there can also get to know the new digital skills directly.

IPOSZ member organizations are present throughout the country, we have offices in a total of 140 cities in the country. We implemented this training in the eastern region of the country, and we were primarily looking for construction companies, entrepreneurs operating in and around the city of Békés.

We provided the opportunity for participants from further distances to take part in the training, but basically the participants came from a 40 km radius.

The training was advertised on the IPOSZ' website. Direct marketing strategies (phone calls and e-mails and many face-to-face conversations) were used to reach most of the participants. Most of the training took place in a small city called Békés. The organization operating there played a particularly active role in recruiting participants. Our 140 trade associations were notified about the planned course, and we also informed our national branch organizations about the training several times. The participants were gathered via this way. The participants came from different professions of the construction sector. By the way, this presented us with a difficult task in terms of organizing the events, as well as the trainer in terms of coaching.

The training and coaching process implemented in the city of Békés can serve as a model for other member organizations operating in other regions. The training material has been prepared and tested, the instructors/teachers are available, and if adequate financial support can be provided, this short-term training that has just been implemented can be implemented in many other cities as well.

On the individual training days, xx people participated:

- On November 20, 2023, 22 people participated in the training

- On November 27, 2023, 25 people participated in the training

- On March 06, 2024, 26 people participated in the training

- On May 08, 2024, 14 people participated in the training

-On May 13, 2024, 14 people participated in the training

- On November 20, 2023, I. educational block with 7 teaching hours

- On November 27, 2023, II. educational block with 7 teaching hours

- followed by 2-3 months of self-study, learning on the job with minimum 10 hours of individual coaching. Individual coaching started with a personal meeting and was supplemented with further online conversations.

- On March 06, 2024, III. educational block with 7 teaching hours

- On May 08, 2024, reporting day with 6 hours presentation and summary of the project results

- On May 13, 2024, reporting day with 6 hours presentation and summary of the project results

The final reporting days provided the opportunity to discuss the coaching experiences together with the group members.

Organisation of the implementation

The organization of the implementation was carried out by the staff of the IPOSZ together with the experts of regional and branch member institutions of IPOSZ which were involved in the implementation.

The lead trainer came from our project partners, IVSZ.

In addition to him, experts of various construction digital solutions also gave lectures, who presented the possibilities offered by Planradar, Orthograph, and Arch line software's too. Apart from them, digital solutions that could also help energy efficiency were also presented to the participants. The presentations given by the experts fit into the curriculum, which is attached.

Considering the already mentioned difficult circumstances, the large distances, the organization required more time and energy than usual. The organization was also complicated by the fact that we had to carry out extensive background information activities beforehand in order to explain the objectives and essence of the project, since the area where the trainings took place is really a less developed part of the country.

We have selected an instructor who is capable of holding similar training in other regions. The selected instructor maintains excellent professional relations with several leading companies providing digital solutions for the construction sector. Several experts from these digital companies were involved in certain parts of the training so that the companies participating in the training could gain even broader knowledge of the latest digital methods in the field of construction. All the instructors have appropriate competencies in the fields of their relevant digital solutions.

This part of the project, on the one hand, defined the main digital aspects for the participating construction businesses and presented them specific implementation methods, based on which they were able to further develop their own business activities. During the coaching, this activity was further developed into the examination of the specific applicability at each company, and the counselling took place in their local environment. This opportunity for individual coaching tailored to the business has not ended, as companies can still contact the instructor and also the IPOSZ.

The trainer made notes on each coaching process for each company. See trainer's description on the participants' requirements, possibilities and development plans, which we attach.

As a general comment, it can be stated that during the implementation, we reviewed an extremely wide range of digital solutions and adapted them to the needs of the participating businesses.

We must point out that the training materials prepared by the Hanse Parlament helped us a lot in the designing of the training, the elements of which we took into account in the training in Hungary. We must also note, however, that for the training in Hungary we had to take into account the existing economic and technical environment, and the often-different development level and economic opportunities exist in Hungary for small businesses. We always do our utmost to ensure that the good practices of other countries could be continuously implemented in Hungary, and we consider this to be a priority task and benefit of the project

Examination was not held. Concentrated on individual development, documented both by the participants and by the trainer. The Hungarian education system centrally regulates which documents the official adult education system can issue, and which exams are required for this. We ourselves can issue a certificate to the participants about the training they have implemented, which indicates the content of the training, the fact that it was completed and refers to the project in which the training was carried out.

The instructor was in constant contact with the participants during the entire duration of the training. Therefore, he dealt with them along individual themes. He summarized his experiences in notes, which are attached as the Summary of the company training. See trainer’s description on the participants’ development.

Based on the completed evaluation forms, it can be concluded that the participants were largely satisfied with the training. The training was rated as useful what encouraged them to further develop their digital skills.

According to our assessment, one of the peculiarities and not a weakness of the training was that it was attended mostly by the smallest enterprises. In this way, we were able to get to know their reactions and test the training at their level of development. We were glad that such small businesses took part in the training, because in Hungary companies with very few employees make up the largest part of businesses. The use of digital solutions in construction processes in the case of such small businesses sometimes exceeds their financial capabilities, although it is clear that most of the digital solutions are available for them and their use can be really effective for the micro companies. They often did not make use of digital tools in a small business, but they are ready to learn easy-to-learn, easy-to-use solutions. For some digital solutions, they need

external service providers who can provide immediate assistance. But short-term, practice-oriented training courses, where small businesses can improve their digital skills, can help a lot here. Having a young person in the family who can bring these digital skills into the operation of the business can help a lot also. There is still a need for many more similar training courses offering industry-specific solutions in order to convince the masses of micro and small enterprises. For this, it would be very important to start state support programs in this area as well.

Main Findings and Conclusions

We have already summarized certain conclusions in the points above. In addition, we must emphasize once again that much more projects, support, information, persuasion and services are needed in order to speed up the catching up of the micro business sector in this area. Our very important comment is that this is extremely necessary, because it is precisely the small businesses that are in direct contact with their consumers and are particularly good at developing their products and services by getting to know the new digital solutions.

The strength of the training, in our opinion, is exactly what we explained earlier, that we managed to attract companies working in the most diverse professions in the construction sector to the training. Another strength of the training was that we were able to do this taking into account the experiences of the international project partners.

For this training and coaching, the instructor basically came from the IT world with more than 20 years of experience. It was a very significant experience for us. Small businesses themselves are rarely able to define their own development directions as accurately as a dedicated IT expert can.

This training was a very good example of how the economic life of small businesses can be significantly helped by receiving guidance from an experienced IT consultant.

In any case, the practice should continue so that dedicated IT experts can help small businesses with their practical advice. Of course, this also helps the work of the IT-related companies, as they receive direct confirmation of the usability of the methods they develop.

During the training, we were able to identify the digital competencies that are still largely missing from the daily operations of small construction businesses. Based on all these experiences, we were able to start our weekly online consulting system, for which more than 100 businesses have since registered and have been receiving continuous help with digital issues ever since. Of course, we continuously deliver these results to the entire membership of our more than 160 industry associations.

We recommend writing a project that could facilitate the operation of such an online service for organizations like ours. Organizations that include family, micro and small businesses do not have a team of experts that can provide specialized services, so we have to use these experts on a contract basis from outside.

The experiences of the companies participating in the training show that what they learned during the training was associated with concrete economic results and an increase in their income.

These positive experiences are shared with other businesses, so it is expected that similar courses will be organized even after the project.

What we were able to do in this project was to create the training material for a short-term practice-oriented, max. 30 hours training for our entire base of members associations to carry out similar training in their own region or profession, and we can also provide specialists and topics for these trainings. The extraordinary advantage of our industry associations' network is that they usually have the necessary premises and infrastructure for such training and their network is nationwide.

Implementation reports of specific development project within the company

Construction sector case studies

Contech #1

Date of establishment: 2018.12. xx.

Number of employees: ~10 persons

Main business activity: Woodworking

The contractor has been a recognized supplier to the public institutions of the county and the region for many years. He typically makes built-in furniture from chipboard. As a micro-enterprise, it carries out carpentry activities at two locations. Administrative activities related to the company are carried out by two people with the involvement of an external accountant.

Their designs are still mostly drawn by hand and stored in paper form. Its CNC-controlled sheet-cutting equipment enables the company to make all kinds of furniture from chipboards.

His successful business was characterized by ever-increasing turnover and ~10% annual profit until 2023. From 2022, there were already signs that the company was forced to go downhill.

Its sales mostly depended on a contracted external commercial partner. The merchant was looking for individual furniture suppliers for major public construction projects. Unfortunately, the state projects have fallen behind and the EU funds that encourage development have dried up as a result of the increasingly tense political situation.

The owner-entrepreneur, who is a member of the IPOSZ community, began to reanalyze his own business based on what he heard at the IPOSZ and IVSZ events. He realized that he has a nationally unique experience in the production of community children's furniture, which he wants to bring to the market directly, without the involvement of a dealer.

With the help of the Project's experts, the following changes are planned in the next 24 months:

Product development

- The company will involve young designers and child psychologists from specialized higher education institutions in the creation of the shapes and colors of children's furniture. - Tenders are conducted electronically using social media platforms..

• Contact university material technologists to promote safe use. The plans will be shared on cloud storage (Gdrive, OneDrive...).

• The company will continuously publish on social media about the development process and the experts involved.

• In order to make it easier to modify, the owner wants to replace the currently used design on paper method with a furniture design program suitable for 3D presentation (e.g. Piper, ms_Furniture designer, PolyBoard..)

Market acquisition

• Some of the companies' more brand-building video clips are already available on Facebook and Tiktok, but at our suggestion, they will be supplemented as personal interviews, targeting professional interested parties, stakeholders as well.

• The owner creates a national customer database, whom he wants to contact in DirectMail (e.g. Mailchimp, Outlook circular) and with a tele-sales offer.

• Makes finished products and existing plans available to registered interested parties in cloud storage (Gdrive, OneDrive...).

Contech #2

Date of establishment: 1993.04xx.

Number of employees: ~40 fő

Main business activity: production of metal processing products

Since the establishment of the company, it has grown from a 50m2 workshop to a factory operating on more than 1000m2. They have continuously developed their machinery and, in addition to cutting and bending machines, they also deal with surface treatment.

Their basic principle is that digital tools are used exclusively for tasks related to product production. Almost the entire production process was implemented with paper-based records, which does not cost to operate the electronic administration and minimizes data recording tasks. It seems unbelievable, but the calculation technique cannot be implemented neither in material procurement, nor in payroll, nor in logistics tasks. Employees are only allowed to use mobile phones during their breaks.

The application of information technology is almost only embodied in communication with customers and suppliers (e-mail, telephone) and in the product catalog displayed on the website maintained by an external developer.

Since 2015, they have successfully participated in four business development tenders. In one of the tenders, a CAD application was purchased, with which data is partly provided for the CNC control, and on the other hand, virtual prototypes are created based on photos during product development.

Despite the minimal level of management, the company grows steadily by 3-8% every year. Their business success is due to the fact that, in addition to the high quality, the fittings they produce are not much more expensive than those of their competitors in the Far East. They can also profitably produce products produced in small series, minimizing operating costs.

Their customers can choose most of the products from the catalog. The production of what is not found in the range is agreed upon in advance. The development of the products is the responsibility of the company owner and the development engineer, who assembles the product on a 3D model.

They receive their orders by e-mail, which are broken down into handwritten lists for production preparation. Scheduling orders is the responsibility of the plant manager. Based on the schedule approved by her, the storekeeper processes the BOM lists and replaces the raw materials as necessary.

Upon completion of some sub-activities of the production process, the workers report their completion directly to the plant manager, who assigns the next task.

The warehouseman is also responsible for preparing the delivery. The finished products are spread around the country several times a week with their own means of transport.

With the help of the Project's experts, the following changes are planned for the next 12 months:

Product development

A good number of production workers are not proficient in reading CAD drawings, and these employees will, at our suggestion, participate in further training in an organized manner. According to the plans, this will be the precondition for making their compensation more favorable.

In this further training, they also count on the help of the EDIHs operating in Hungary.

Business processes

Neither in terms of production nor business processes, they do not want to move away from the analog practice that has been successful for years. They continue to plan only the most necessary investments, which aim to directly serve the needs of the current customer base.

Contech #3

Date of establishment: 2019.05. xx.

Number of employees: ~4 fő

Main business activity: Painter

The company operates in a small town in southern Hungary, where it primarily meets the needs of the surrounding area. In addition to the company manager, three other skilled workers carry out the construction tasks. The administrative activities related to the company are performed by his wife, who runs a service family business in the city. Its site also provides site and warehouse capacities for Contech#3.

In the beginning, they only worked on wall painting, but two years ago, the company manager enrolled in a regional adult training course, during which he can officially carry out heat and sound insulation and fine plaster contractor work.

The company's annual turnover exceeded HUF 200M in the best years, but the economic difficulties of the past period also damaged their order book.

Most of their clients are residential, but they also work for institutions as subcontractors.

Their news mainly spreads by word of mouth, but they have tried several times to display simpler free content on FaceBook - mostly without much success.

A good part of their success in the past was due to the fact that the government provided the population with a support framework for the renovation of several buildings and the construction of new homes. This forced them to strengthen their internal administration in order to produce and store the required documents and contracts for the customers. Here, they primarily relied on the experience of "Angéla", who administers the process and stores the data on her workstation using illegal software. After the works are completed, her husband checks the cost trends and profitability on paper in order to adjust the contract prices accordingly. Invoicing is solved using a market-leading freeware.

With the termination of tenders, the number and volume of orders also decreased. It became clear that the profits of insulation work are much higher, but there are much fewer customers who require them, who are more difficult to reach.

During the consultation with the project experts, the following development goals were identified:

Market acquisition

Spreading the awareness and value of the Contech #3 brand in a wider circle, presenting István as an expert in social media. The painting content would be posted on Instagram by regularly posting results and references, while the clips introducing the tricks of insulation would be posted on FaceBook and Tiktok. Campaigns would be launched with a modest payment plan.

To support administrative activities, the company will subscribe to a Microsoft 365 service, which provides a secure cloud storage location, professional mail and Teams services, and the use of some legal software. Among other things, they hope that this will make the company's data assets much more secure.

Contech #4

Date of establishment: 2008.06.xx.

Number of employees: ~50 people at group level

Main business activity: Sports equipment production – Sport Hall construction

The business, together with other businesses related to the construction industry, is 100% owned by natural persons. In a short time, it gained wide recognition in the world of domestic hall construction and sports equipment production.

Their facilities cover an area of more than 2,000 m2, which includes a state-of-the-art woodworking unit, an upholstery workshop, and a metalwork unit with a modern powder coating workshop. Most of them were built and mechanized using EU tenders.

Thanks to continuous developments, new ideas, changed standards and unique customer requirements are realized based on computer design. Our company is expanding year by year thanks to successful EU and other tenders.

Their products are made in accordance with industry regulations, Hungarian sports equipment standards, and rules prescribed by sports associations. The products manufactured and distributed by them are delivered to the user after precise quality control. They carry out their delivery and assembly activities with their own fleet of machines covering the whole of Hungary.

Their main product ranges: Gymnastics equipment, basketball equipment, net racks (tennis, volleyball, badminton), sports goals, sports nets, protective nets, skill development equipment, kindergarten equipment, space separation equipment, mobile and fixed stands, stages, gymnastics podiums, wall coverings, as well as office and school furniture, in a wide selection and in unique design.

The range of products and services of the enterprise is selected by some state, local government, or church organization. Typically, they come into contact with the client through a project company or as subcontractors of a general contractor. The construction project is managed on the main contractor's infrastructure and following its methodology. This is very different in each case, but digitized elements, such as collaboration based on cloud sharing or videoconferencing tools, are appearing more and more often.

The majority of sports facilities are implemented on a campaign basis, the investors do not have the financial resources for continuous maintenance, for concluding maintenance contracts beyond the warranty, for carrying out inspections and minor repairs.

Plans to transform the operation with the help of digitization

Post sales support

At our suggestion, the company plans to maintain a monitored chat community on social media where sports hall operators can share their experiences. The company's specialists can monitor some of the problems and thus they are not permanently separated from those who temporarily pause their maintenance subscription. In the future, if this forum becomes stronger, an advanced level of counseling could be introduced on this platform.

The company's management is also interested in free training for businesses, which IPOSZ and DigitalTech EDIH jointly organize in the region.

Contech #5

Date of establishment: 2010.02.xx.

Number of employees: ~4-6 employees

Main business activity: Cold cladding, apartment renovation

For years, Attila took on occasional assignments in the central Hungarian region at very low prices. This came to an end when, during one of his jobs, he was involved in several projects one after the other for an interior designer in the capital. Gathering around him some representatives of other trades (room painter, dry construction, decor painter, warm tiler...) he formed his own business, which has been operating successfully ever since. They undertake complex renovation tasks in a loose alliance with other contractors, recommending each other. The collaboration is based on trust and commitment to quality.

Typically, they accompany the entire construction process from the start of the project. They are working on site in three phases. They start the demolition after the machinist and the electrician

disconnected the apartment from the utility network. If they work for several days, 2-3 of them stay in Budapest, otherwise they go home (120 km) and come back the next day. They create partition walls and false ceiling. Meanwhile, the mechanical colleagues carry out the basic installation. If it is necessary to replace doors and windows or install air conditioning equipment, they are also carried out in this phase.

For the third time, the sealing of the walls and false ceiling and the painting and wallpapering begin. At the end of this stage, even the warm covers are put in place. There is always a need for modifications and improvements, which all interested parties must be constantly informed about.

It causes tension and extra costs if the representatives of the various specialized industries are only informed late about the difficulties and problems that arise.

Since there is no main contractor for most of their construction work, the contractors working on the project share responsibility and try to appreciate each other's work, to handle the handover of the area as smoothly as possible without hiding the problems.

Plans to transform the operation with the help of digitization

Project communication

A significant part of the problems that arise during construction can be traced back to insufficient communication.

We distinguished the following problems:

• Information arrives late

• One of the actors participating in the construction is left out

• The decisions are not clear.

At our suggestion, Contech #5 introduced a new working method, which we have already presented in several places as a best practice:

At the start of each project, "Attila" creates a new Viber group to which he invites not only his own colleagues, but also the engineering colleagues and the designer. During each phase of the work, when necessary, a group video call is held, where major events of the construction project are

coordinated. If a design changes, the designer will also publish it on this free platform. Any problems are documented here, and a joint decision is made to eliminate the error.

According to them, the introduction of this new communication significantly improved both collaboration and mood by making conflicts less likely to cause unexplored tensions.

Contech #6

Date of establishment: 2015.03.xx.

Number of employees: ~4 employees, variable

Main business activity: Construction of water and gas networks,

"Contech #6" is a family business that has been serving customers for over twenty years. The founder, "István", is an experienced gas fitter who started the profession at a young age and gained a lot of knowledge and experience over the years. In recent decades, two of his sons joined the business, further strengthening family ties and professional standards. The older boy helps with physical work, the younger one has finished school, received a professional qualification and had several qualifications, so he already takes on work independently.

The main profile of the company is water and gas installation and maintenance, but they also deal with the installation and modernization of heating systems. Their clients include private individuals, condominiums and small businesses.

The advantage of a family business is that they provide a fast and flexible service, since they are in direct contact with customers, so they can offer personalized solutions. "István" and his sons are committed to continuous professional development, they regularly participate in further training to keep up with industry innovations.

"Contech #6" is renowned for its reliability and high-quality workmanship, coupled with a friendly and helpful customer relationship. Over the years, they have acquired many satisfied customers, many of whom have become return partners and are happy to recommend them to their friends.

Plans to transform the operation with the help of digitization

Account tracking

For years, "Contech #6" faced serious challenges in terms of recording and collecting accounts receivable. This was partly due to the fact that they had many open projects at the same time in various states of readiness, even with a lead time of several years. The family business was often faced with late or non-payment by their clients for their services. This not only caused them financial difficulties, but also consumed a lot of time and energy, which could have been spent on running and developing the company.

The breakthrough for them was the introduction of banking income tracking services of the Számlázz.hu application. The online service they subscribed to at our suggestion allowed them to track incoming and unpaid payments in real time, so they could immediately see which invoices hadn't been paid yet. And the sending of automated notifications and reminders greatly facilitated the collection process, reducing the number of defaults.

Thanks to the integration of the Számlázz.hu application, "Contech #6" was able to significantly reduce its accounts receivable, which had a positive effect on the financial stability of the business. The administrative burden was also reduced, as they had to spend less time tracking invoices and liaising with customers.

Since the introduction of the automated system, "István" and his sons are calmer and more confident about the finances of their business. Contact with customers has also become smoother, as financial issues can be clarified immediately thanks to accurate and transparent records. The services of the Számlázz.hu application not only made the operation of the company easier, but also reduced the stress level, which resulted in a noticeable improvement in everyday work.

Through its fintech system, "Contech #6" raised its financial management to a new level and significantly improved the efficiency and profitability of the business. This digitization solution will continue to be an indispensable tool for the successful operation of the family business in the future.

Attachments

- Signed participant list
- Curriculum
- Photos taken at the training and at the companies

6. Evaluation Concept[21]

Introduction

The focus of evaluation depends on goals of the process evaluated. Concerning the evaluation also further aspects such as Timeline and the opportunity to impact is to be considered. In common, evaluations tend to be multilevel and have a look at both towards and backwards. The aim of the evaluation is to support implementing and improving of the training; thus, the evaluation is multilevel, and the focus is on issues that we have an opportunity to impact on.

The evaluation should be scheduled so, that the whole course is still in the memory of respondents. If the course is single activity like lecture, practical training, or e-learning session, this is no problem. The evaluation survey or interview can be conducted immediately after the training without any risk on confusions concerning the target of the evaluation. But if there are more activities, the course lasts weeks or months, or consists of many meetings with certain interval, the risk of bias, caused by uncertainty about which part the survey or interview deals with, increases. This means that in such cases either the survey should be conducted separately after each phase or questions should be written so, that the risk of bias becomes minimized.

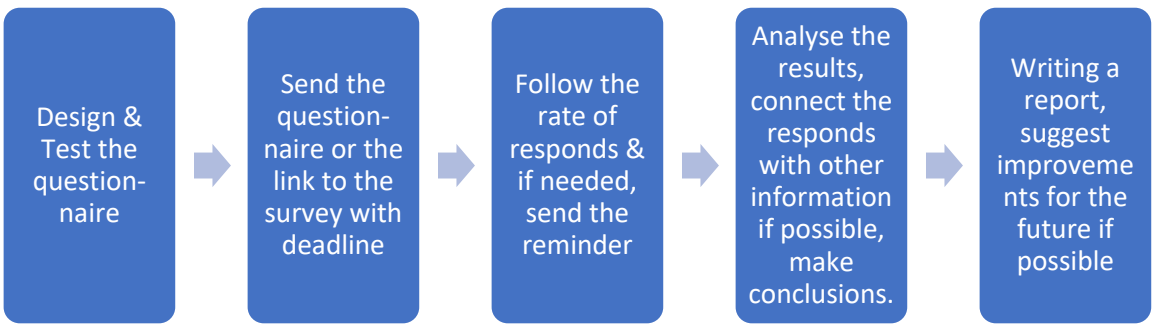
The process

In best cases, the evaluation survey and the report cover the evaluated course as a whole. This is not always possible, because e.g., the training may have been divided into parts with long periods between each, or parts of the course are quite different from each other. In such cases, it is recommendable to conduct the evaluation and write the report separately in each phase to avoid bias caused by time. These individual reports can then be summarised in concluding report.

This evaluation concept covers different types of courses. Some of these can be evaluated as a whole, but some must be evaluated phase by phase or can be evaluated only partially. However, the evaluation method, phases and tools are similar in each case.

The evaluation is planned to be conducted in paper form as well as using the online survey application Zensus. Both of them enable the anonymity of the respondents. The participants can decide themselves which way of evaluation they want to use.

The Evaluation process should follow the concept:



[21] Compiled by Tamas Ferenczi (M.Sc.) and Andreas D. Weise (Prof. Dr.-Ing.), Buxtehude University of Applied Sciences, Germany

Figure 2: Evaluation Prozess

Target groups of the evaluation

The main target group is those participating the courses, i.e., students participating the course.

Questionnaires and duties of each test facilitator

The questionnaires will be prepared course by course. The finishing of each questionnaire will be made when the programme of the course to be tested and evaluated is available (Table 1). The facilitator of the test sends the programme to HS21 early enough so that HS21 has at least two weeks to finish the questionnaire for the training in question. HS21 will send the links to each questionnaire to the facilitator who delivers the links and instructs the target groups to complete the questionnaire. The questionnaire will be also prepared to be printed in pdf and will send out to the facilitator to be printed and then to hand out to the participants.

Needs to translate the questionnaire?

If the questionnaire needs to be translated to domestic language, a facilitator should announce this at least 2 weeks before the training starts. HS21 will then send a preliminary questionnaire of each target group to be translated. Facilitator will send the translated (or proofed, if HS21 has made the translation) version to HS21 together with the training programme latest two weeks before the planned test course starts.

When the course starts

In the beginning of each course, the facilitator informs, that the course will be evaluated, and that participants will receive a link to the evaluation questionnaire in the end of the course. Participants should be informed that the evaluation helps the facilitators to develop and improve the course in the future.

When the course ends

In the end of the course, facilitator gives the link to the survey to students, or hands out the questionnaire in printed form, reminding them that each answer is important, and informs the period when the evaluation survey is active. It is recommended that Questionnaires online as well es in printed form be filled out immediately. One participant should fill the questionnaire only once. After one week the responding period will be finished. Also, teachers and employers should be given links to their own surveys, if such are required in the training in question.

After the responding period has finished, HS21 will collect the results from the online system, analyse them and write a report. Printed questionnaires filled by participants must be scanned and sent to HS21 via Email within the responding period. HS21 will take these also into the analysis.

Table: Summary of the duties, process and schedule of the test

Deadline and responsible party	Task
Latest two (1) weeks before the start of the course / training facilitator of the course should	• inform HS21 about the schedule of the course, • inform HS21 whether the questionnaires should be translated or not. If translation is needed, return the questionnaires included with translations written on the form.

	• send HS21 a brief info about the curricula (only **names** and **e-mail addresses** of the teachers, and **topics** they will teach are required).
Within two (1) weeks calculated from receiving the information listed above, HS21 will	• create the specific survey for this course, • translate the questionnaire • send the links to surveys to the facilitator and inform the deadline for the responding. • Send the questionnaires via Email to be printed.
When the course starts, facilitator will Inform the participants, teachers, and enterprises that	• the course will be evaluated, • the link to the evaluation survey or the questionnaires in printed form will be given in the end of the course or phase of the course, and • that it is important for developing the course that everyone complete the questionnaire once!
When the course or phase of the course ends, facilitator will	• deliver the links to survey to each group of respondents (participants, teachers, enterprises) either by e-mail or in other acceptable way • give the opportunity to fill out the questionnaires in paper form • inform the respondents about the deadlines, and • remind them about the importance of the evaluation. • Scan the printed questionnaires filled by participants and send to HS21 via Email within the responding period.
When the given deadline has been passed, HS21 will	• receive all scanned printed questionnaires filled by participants in paper form • open the online database and collect and analyse the results, • write a report, and • send the report to be discussed.

The report

In the report, following issues will be reported: A rough description of the group of respondents, have they been satisfied with the facilitations, topics, teachers, and their group, do they believe that the training has been beneficial, and what could have been made in other way. Furthermore, in certain courses and trainings also teachers' and employers' opinions will be surveyed and reported. These cases will be agreed together and announced separately.

In the end of each report there will be a concluding section that summarizes the findings and gives some suggestions concerning the opportunities to improve and develop the curriculum and / or facilitations. If wanted and agreed, all the evaluations will be summarized together.

Appendices

Appendix A The template of the questionnaire for participants of training	
Appendix B The template of the questionnaire for training lecturers	

Appendix C The template of the questionnaire for companies that KAIN method related projects were carried out in	

Appendix A The template of the questionnaire for participants of training

A1. Background information

1.1. In which country did you did you take the course for further training?

◯ Germany ◯ Hungary ◯ Poland
◯ Latvia ◯ Finland
◯ Other Country: .....

1.2. What is your highest education?

◯ Doctor or resp. ◯ Master of Science ◯ Bachelor
◯ Master VET ◯ Vocational Education ◯ Matriculation Exam
◯ Comprehensive School ◯ None

1.3. Employment: At the moment you are

◯ working ◯ studying ◯ unemployed
◯ retired ◯ other: .....

1.4. In which branch you are / were / will be working or studying

◯ Education and training ◯ Consulting ◯ Construction
◯ Finishing ◯ Electrician ◯ Plumber
◯ Architect ◯ Construction Eng. ◯ Electrical Eng.
◯ Piping Eng. ◯ Public Authority ◯ Other: .....

1.5. Experience in the branch

◯ 0 - 5 years ◯ 6 - 10 years
◯ 11 - 20 years ◯ More than 20 years

1.6. Age: At the moment you are

◯ Less than 30 year old ◯ 30 – 60 year old ◯ More than 60 year old

1.7. Gender: Are you

◯ Female ◯ Male ◯ Other ◯ Do not want to say

A2. <u>The study course (Part 1 – Class room learning, day 1 and day 2)</u>

2.1. Facilitations:

	Very suitable	Suitable	Quite ok	Could had been better	Not suitable
The Place for the Training was	◯	◯	◯	◯	◯
The time (Date) of the training was	◯	◯	◯	◯	◯
The length of the training was	◯	◯	◯	◯	◯
The schedule of the training was	◯	◯	◯	◯	◯
The facilitations (room, equipment etc) were	◯	◯	◯	◯	◯

2.2. In common, the topics were (5 choices max):

◯ Topical ◯ Interesting ◯ Important

◯ Close to my needs ◯ Up to date ◯ Boring

◯ Out-of-date ◯ Unnecessary

2.3. In common, the teachers (5 choices max):

◯ Used interesting and motivating methods ◯ Dealt with important topics

◯ Were professionals in their branch ◯ Met the expectations

◯ Were up-to-date ◯ Were boring

◯ Were out-of-date ◯ Wandered off the point

2.4. In general

	Absolutely true	True	Hmm, quite ok	Not true
The information given was up-to-date	◯	◯	◯	◯
The presentation was clear and understandable	◯	◯	◯	◯
There was time enough for the topic	◯	◯	◯	◯
There was time enough for the discussion	◯	◯	◯	◯
The tasks given were clear and understandable	◯	◯	◯	◯
The atmosphere in the course / lessons was good and open.	◯	◯	◯	◯
We had a good team spirit	◯	◯	◯	◯

2.5. Course content and structure

	Very good	good	Hmm, quite ok	Not ok
Course structure	◯	◯	◯	◯
Used tools and Resources (Presentation, black board notes, digital tools)	◯	◯	◯	◯
Learning Materials (Script, Handouts)	◯	◯	◯	◯
Quality of study course in summary	◯	◯	◯	◯
Course content overview	◯	◯	◯	◯
Estimated time for the lessons	◯	◯	◯	◯
Scope of teaching content	◯	◯	◯	◯

2.6. Evaluation of the trainer

	Very good	good	Hmm, quite ok	Not ok
Study method fits to the content (Groupwork, discussion forum)	◯	◯	◯	◯
Interesting, descriptive explanation of study contents	◯	◯	◯	◯
Direkt connection between theory and praxis, by practical examples	◯	◯	◯	◯
Friendliness and kindness of the trainer	◯	◯	◯	◯
Handling of questions, critics and objections	◯	◯	◯	◯
Reliability on meetings and agreements	◯	◯	◯	◯
Availability of trainer in case of questions	◯	◯	◯	◯

2.7. What would you like to say to teachers / facilitators. What could have done better, what should not be changed etc. Do you have any suggestions for improving the spatial and/or technical equipment?

A3. <u>Project phase (Part 2 – Self learning and project work)</u>

3.1. Prescribe shortly your project work

.....
.....

.....
.....

.....
.....

3.2. How much time was reserved for this phase?

◯ 8 weeks ◯ 9 weeks ◯ 10 weeks ◯ 12 weeks

3.3. About the project phase

	Absolutely true	Generally true	Partially true	Not true
The time period was well reserved for the project phase	◯	◯	◯	◯
The tasks and goals for the project phase were well explained	◯	◯	◯	◯
I knew well, what my tasks are and which project I will work on	◯	◯	◯	◯
The project was well connected to the topics of the course before	◯	◯	◯	◯
The project was connected to collaboration or civic participation	◯	◯	◯	◯
Tools presented in the course were used in the learning project	◯	◯	◯	◯
The learning project was strongly integrated in the company	◯	◯	◯	◯
The learning project was realized and implemented in the company	◯	◯	◯	◯
Due to the project phase I learned several new skills in digital collaboration	◯	◯	◯	◯
The learning project was completed by myself	◯	◯	◯	◯

3.4. What would you like to say to trainers? What could have done better, what should not be changed etc. Do you have any suggestions regarding the project phase?

A4. <u>Reporting and reflection phase (Part 3 – Reporting day)</u>

4.1. How many projects were presented and discussed on this day?

◯ less than 3 ◯ 3 - 5 ◯ 6 - 9 ◯ more than 10

4.2. About the reporting day

	Absolutely true	Generally true	Partially true	Not true
The projects were presented by participants	◯	◯	◯	◯
The time schedule for this day was well prepared	◯	◯	◯	◯
Enough time were given for discussion about the projects	◯	◯	◯	◯
Failures, lessons learned were also included	◯	◯	◯	◯
Conversations about the projects were possible	◯	◯	◯	◯
I have gained knew knowledge and experiences by other projects	◯	◯	◯	◯
The presented projects are well suitable to realize in my company	◯	◯	◯	◯
The concluding lecture was well structured	◯	◯	◯	◯

4.3. What would you like to say to the trainers? What could have done better, what should not be changed etc. Do you have any suggestions regarding the reporting day?

Appendix B The template of the questionnaire for training lecturers

B1. Background information

1.1. In which country did you did you trained the course?

◯ Germany ◯ Hungary ◯ Poland

◯ Latvia ◯ Finland

◯ Other Country: .....

1.2. What is your highest education?

◯ Doctor or resp. ◯ Master of Science ◯ Bachelor

◯ Master VET ◯ Vocational Education ◯ Matriculation Exam

◯ Comprehensive School ◯ None

1.3. Employment: At the moment you are

◯ working ◯ studying ◯ unemployed

◯ retired ◯ other: .....

1.4. In which branch you are / were / will be working or studying

◯ Education and training ◯ Consulting ◯ Construction

◯ Finishing ◯ Electrician ◯ Plumber

◯ Architect ◯ Construction Eng. ◯ Electrical Eng.

◯ Piping Eng. ◯ Public Authority ◯ Other: .....

1.5. Experience in the branch

◯ 0 - 5 years ◯ 6 - 10 years

◯ 11 - 20 years ◯ More than 20 years

1.6. Age: At the moment you are

◯ Less than 30 year old ◯ 30 – 60 year old ◯ More than 60 year old

1.7. Gender: Are you

◯ Female ◯ Male ◯ Other ◯ Do not want to say

B2. The Study Course / Lessons (Part 1 – Class room learning, day 1 and day 2)

2.1. Facilitations:

	Very suitable	Suitable	Quite ok	Could had been better	Not suitable
The Place for the Training was	◯	◯	◯	◯	◯
The time (Date) of the training was	◯	◯	◯	◯	◯
The length of the training was	◯	◯	◯	◯	◯
The schedule of the training was	◯	◯	◯	◯	◯
The facilitations (room, equipment etc) were	◯	◯	◯	◯	◯

2.2. In common, the participants (5 choices max):

◯ Were interested and motivated in learning new methods

◯ Had experience in their branch

◯ Had enough knowledge

◯ Were not qualified enough for the course

◯ Have participated in discussions

◯ Were bored

◯ Had no attention

2.3. In general

	Absolutely true	Generally true	Partially true	Not true
There was time enough for the topic	◯	◯	◯	◯
There was time enough for the discussion	◯	◯	◯	◯
The tasks given were clear and understandable	◯	◯	◯	◯
The atmosphere in the course / lessons was good and open.	◯	◯	◯	◯
We had a good team spirit	◯	◯	◯	◯
Different methods were used e.g. groupwork, discussion forum,	◯	◯	◯	◯
Different practical examples were presented and discussed	◯	◯	◯	◯
Different learning tools were used e.g. Power Point slides, online learning platform, Videos etc.	◯	◯	◯	◯

2.4. What could have done better, what should not be changed etc. Do you have any suggestions or lessons learned for improving the spatial and/or technical equipment?

B3. Reporting and reflection phase (Part 3 – Reporting day)

3.1. How many projects were presented and discussed on this day?

◯ less than 3 ◯ 3 - 5 ◯ 6 - 9 ◯ more than 10

3.2. About the reporting day

	Absolutely true	Generally true	Partially true	Not true
The projects were presented by participants	◯	◯	◯	◯
The time schedule for this day was well prepared	◯	◯	◯	◯
Enough time were given for discussion about the projects	◯	◯	◯	◯
Failures, lessons learned were also included	◯	◯	◯	◯
Conversations about the projects were possible	◯	◯	◯	◯
The concluding lecture was interactive, the high participation of the participants	◯	◯	◯	◯

3.3. What could have done better, what should not be changed etc. Do you have any suggestions or lessons learned regarding the reporting day?

Appendix C The template of the questionnaire for companies

C1. Background information

1.1. In which country were you participated in further training?

◯ Germany ◯ Hungary ◯ Poland

◯ Latvia ◯ Finland

◯ Other Country: .....

1.2. How many employees do your company have?

◯ 1-man-business ◯ less than 10 ◯ between 10 - 20

◯ between 20 - 50 ◯ between 50 - 100 ◯ between 100 - 500

◯ between 500 - 1000 ◯ more than 1000

1.3. How many company locations do your company have?

◯ 1 ◯ 2 ◯ 3 - 5

◯ 5 - 10 ◯ more than 10

1.4. In which branch are you active?

◯ Education and training ◯ Consulting ◯ Construction

◯ Finishing ◯ Electrician ◯ Plumber

◯ Architect ◯ Construction Eng. ◯ Electrical Eng.

◯ Piping Eng. ◯ Public Authority ◯ Other: .....

1.5. Experience in the branch

◯ 0 - 5 years ◯ 6 - 10 years

◯ 11 - 20 years ◯ More than 20 years

1.6. Your company is

◯ in the public sector ◯ private, inland ◯ international

C2. <u>Project phase (Part 2 – Self learning and project work)</u>

2.1. Prescribe shortly the project work, that were completed in your company:

.....
.....

.....
.....

.....
.....

2.2. How much time was reserved for this phase?

◯ 8 weeks ◯ 9 weeks ◯ 10 weeks ◯ 12 weeks

2.3. About the project phase

	Absolutely true	Generally true	Partially true	Not true
The time period was well reserved for the project phase	◯	◯	◯	◯
The tasks and goals for the project phase were well explained	◯	◯	◯	◯
The project was well integrated into the company	◯	◯	◯	◯
The project was connected to collaboration or civic participation	◯	◯	◯	◯
More digital tools were used in the learning project	◯	◯	◯	◯
The learning project was realized and implemented in the company	◯	◯	◯	◯
Our company gained new skills and knowledge in digital collaboration by the project	◯	◯	◯	◯
The learning project was self-completed by the course participant	◯	◯	◯	◯
Due to the project we use more digital tools now than before	◯	◯	◯	◯

2.4. What would you like to say to trainers? What could have done better, what should not be changed etc. Do you have any suggestions regarding the project phase?

7. Evaluation Report[22]

Introduction

The focus of evaluation depends on goals of the process evaluated. Concerning the evaluation also further aspects such as Timeline and the opportunity to impact is to be considered. In common, evaluations tend to be multilevel and have a look at both towards and backwards. The aim of the evaluation is to support implementing and improving of the training, thus, the evaluation is multilevel, and the focus is on issues that we have an opportunity to impact on.

The evaluation should be scheduled so, that the whole course is still in the memory of respondents. If the course is single activity like lecture, practical training, or e-learning session, this is no problem. The evaluation survey or interview can be conducted immediately after the training without any risk on confusions concerning the target of the evaluation. But if there are more activities, the course lasts weeks or months, or consists of many meetings with certain interval, the risk of bias, caused by uncertainty about which part the survey or interview deals with, increases. This means that in such cases either the survey should be conducted separately after each phase or questions should be written so, that the risk of bias becomes minimized.

The results of the evaluation

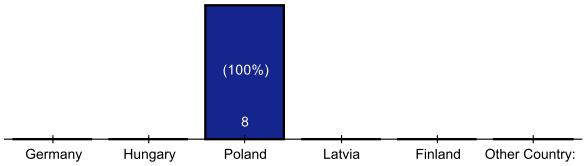
In this report, the results of evaluations of three test course implemented in Latvia, Poland, and Hungary will be reported. The country-specific findings will be first presented and summarized, and after this, there will be a concluding section that summarizes the findings and gives some suggestions concerning the opportunities to improve and develop the curriculum and / or facilitations.

Poland

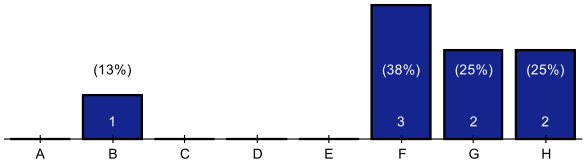
Participants – Students

Demography

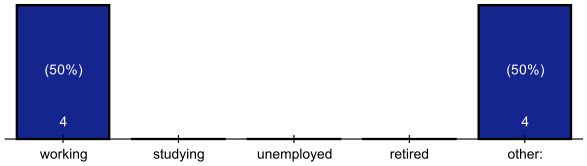
[22] Compiled by Tamas Ferenczi (M.Sc.) and Andreas D. Weise (Prof. Dr.-Ing.), Buxtehude University of Applied Sciences, Germany



1.1. In which country did you did you take the course for further training?



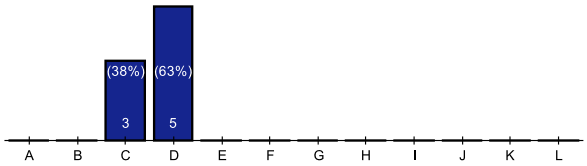
1.2. What is your highest education?
A Doctor or resp. (0)
B Master of Science (1)
C Bachelor (0)
D Master VET (0)
E Vocational Education (0)
F Matriculation Exam (3)
G Comprehensive School (2)
H None (2)



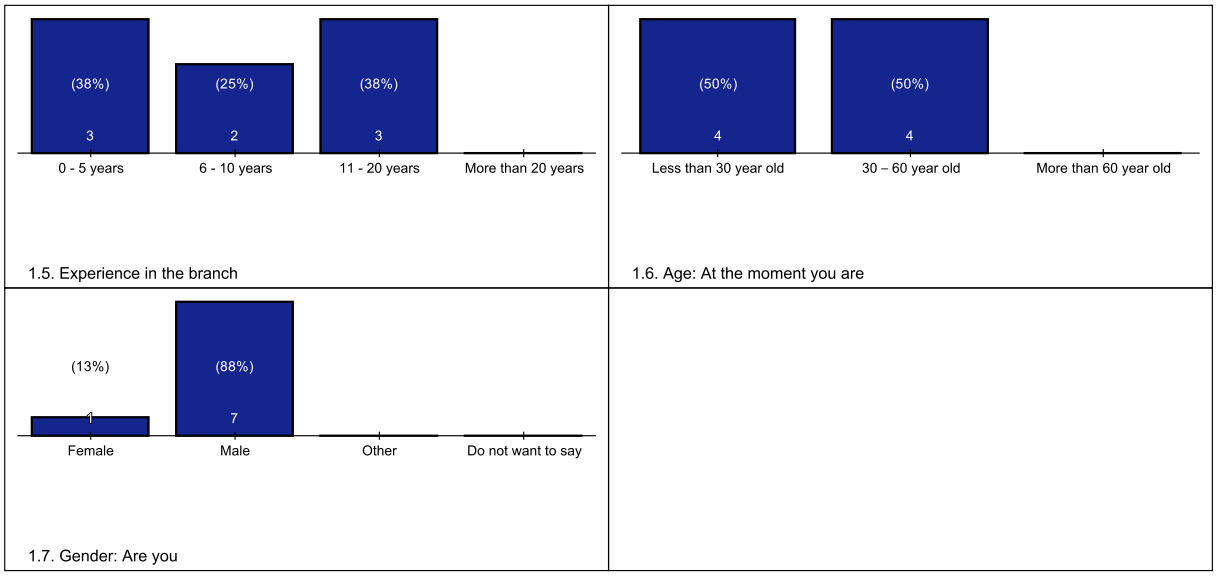
1.3. Employment: At the moment you are

Answers for other employment

- Self employed *(2 Mal)*
- Trainee
- trainee



1.4. In which branch you are / were / will be working or studying
A Education and training (0)
B Consulting (0)
C Construction (3)
D Finishing (5)
E Electrician (0)
F Plumber (0)
G Architect (0)
H Construction Eng. (0)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)

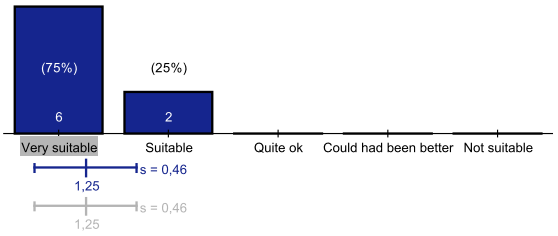


The evaluation survey was responded by 8 students who participated the course. The age distribution of students skews towards youth, under 30 years old (50%) and falling within the age range between 30 and 60 years (50%). In terms of gender representation, males dominate the sample with proportion of 88%. 50% of students are currently engaged in working as employees, meanwhile 50% of students are trainees or self-employed.

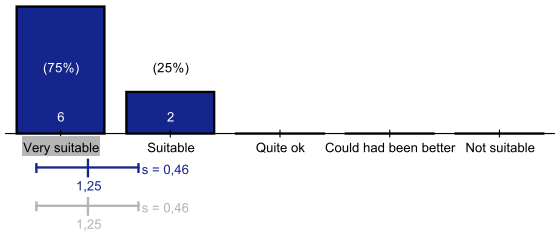
In terms of education, half of the students did not have higher education (50%) Other have pursued higher degrees like matriculation exam (38%) and one student pursued Master of science.

In terms of field of study or work, all students are working in the construction and finishing branch. 38% of the participants have less than 5 years working experience, 25% have 6-10 years' experience, and 38% have 11-20 years' experience in the branch.

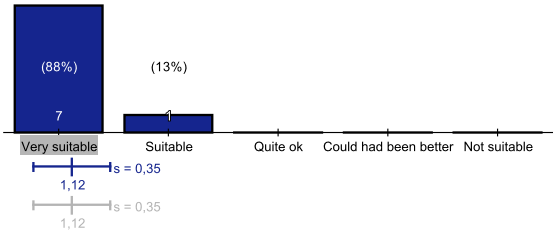
Educational Block



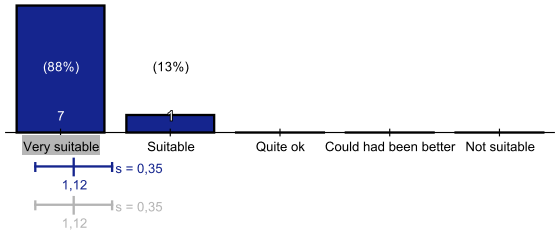
The Place for the Training was



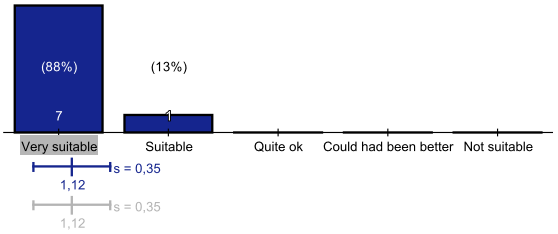
The time (Date) of the training was



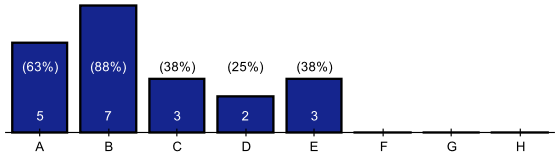
The length of the training was



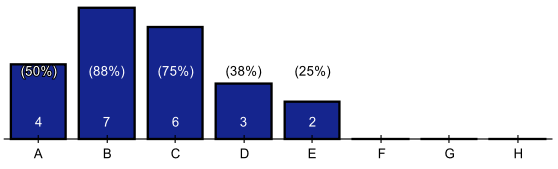
The schedule of the training was



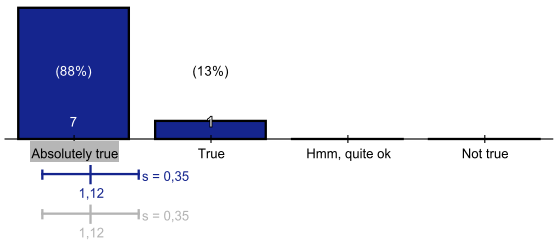
The facilitations (room, equipment etc) were



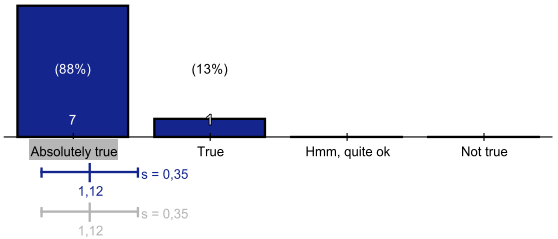
2.2. In common, the topics were (5 choices max):
A Topical (5)
B Interesting (7)
C Important (3)
D Close to my needs (2)
E Up to date (3)
F Boring (0)
G Out-of-date (0)
H Unnecessary (0)



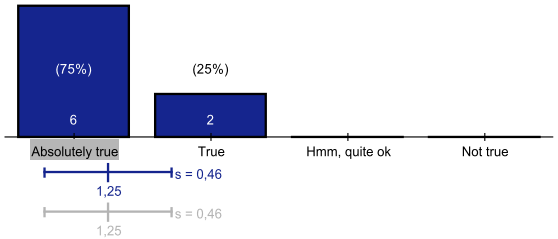
2.3. In common, the teachers (5 choices max):
A Used interesting and motivating methods (4)
B Dealt with important topics (7)
C Were professionals in their branch (6)
D Met the expectations (3)
E Were up-to-date (2)
F Were boring (0)
G Were out-of-date (0)
H Wandered off the point (0)



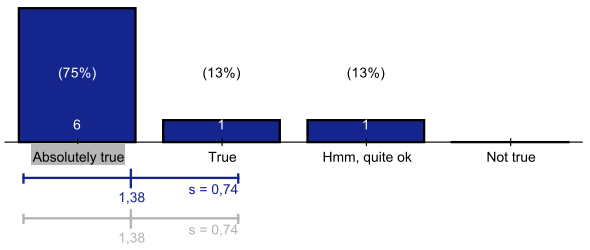
The information given was up-to-date



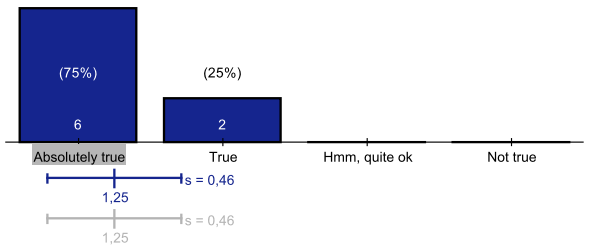
The presentation was clear and understandable



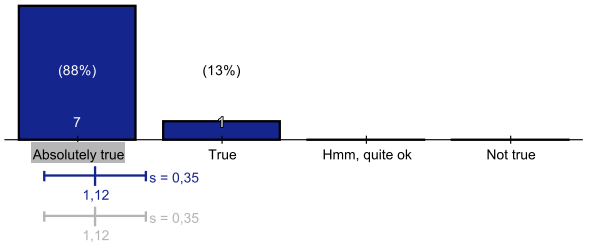
There was time enough for the topic



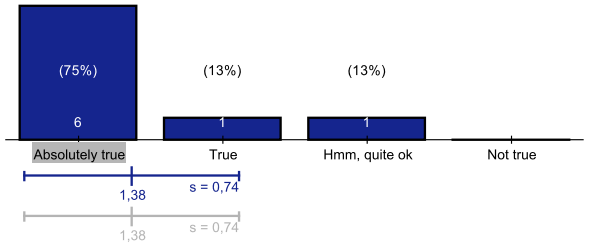
There was time enough for discussion



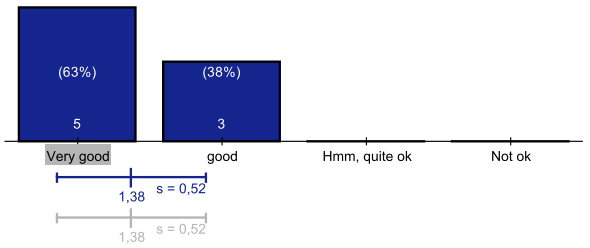
The tasks given were clear and understandable



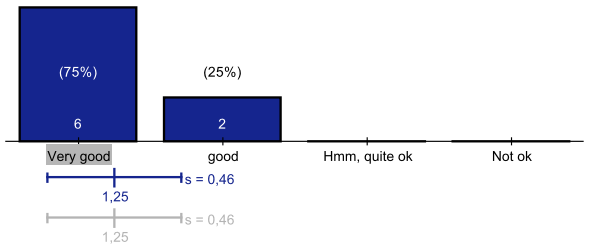
The atmosphere in the course / lessons was good and open.



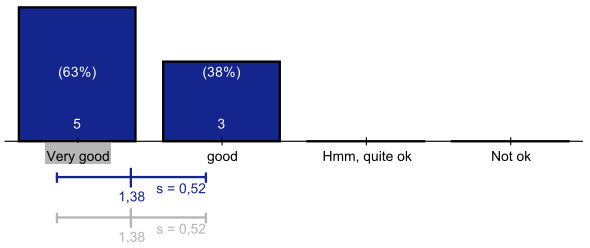
We had a good team spirit



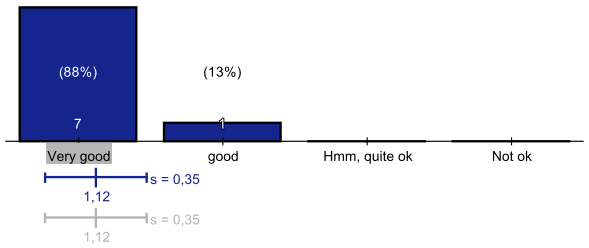
Course structure



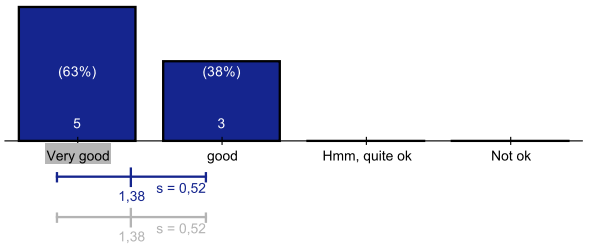
Used tools and Resources (Presentation, black board notes, digital tools)



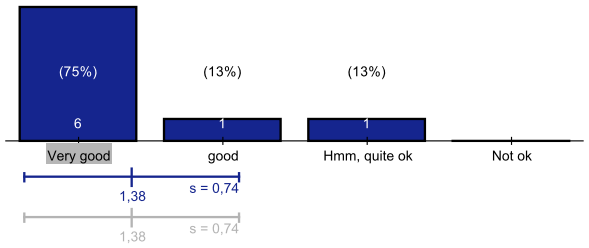
Learning Materials (Script, Handouts)



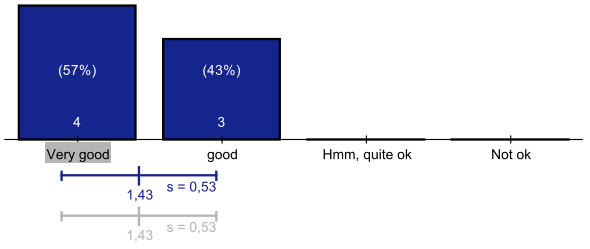
Quality of study course in summary



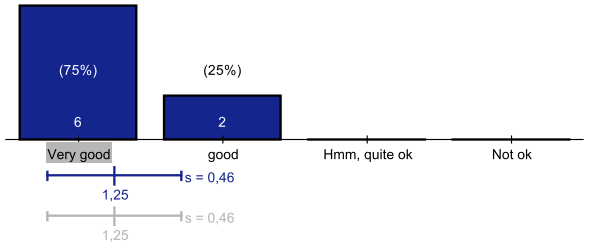
Course content overview



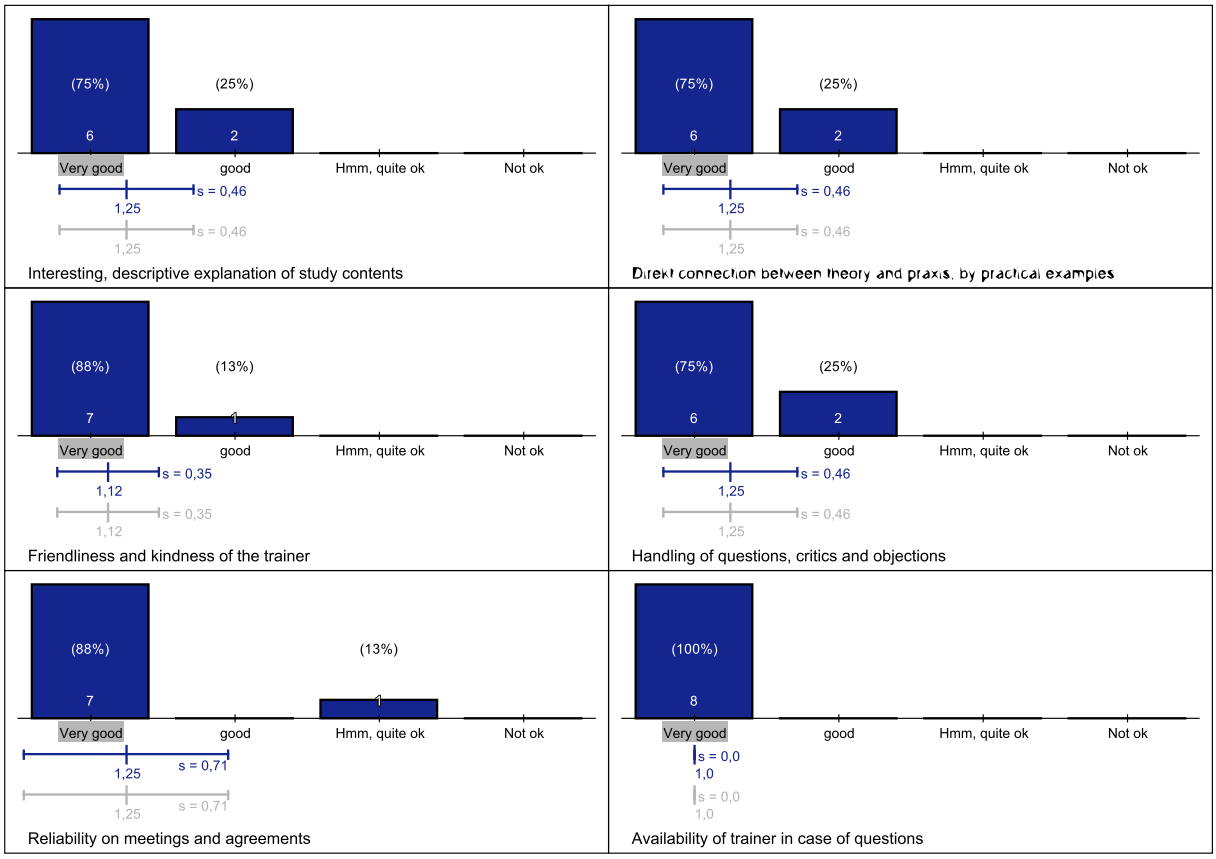
Estimated time for the lessons



Scope of teaching content



Study method fits to the content (Groupwork, discussion forum)



Responses collected indicate a positive sentiment among students towards their learning experiences during the educational block. The students are agreed that the information in the course was important and up to date. They appreciated the atmosphere in the lessons, along with sufficient time allocated for the topic.

Free form answers

What would you like to say to teachers / facilitators. What could have done better, what should not be changed etc. Do you have any suggestions for improving the spatial and/or technical equipment?

- *Everything was fine (two times)*
- *No comments (two times)*
- *Nothing, everything suited me, thank you.*

Prescription of applied digital working processes or tools

- *Exoskeleton, and thermal imaging camera a very useful thing*
- *In my work, I used drones, which were used to inspect construction facilities, as well as the company's marketing videos. These tools are very useful and helpful in my work, especially to promote my company in the market.*
- *I used an exoskeleton and tried out a drone on a construction site. I think both tools work well in this industry.*
- *I used the capabilities of thermal imaging cameras to locate and remove heat loss in the building*

- *I used thermal imaging cameras and digital dalliers*
- *The use of a drone, an exoskeleton - a tool compatible with the network, which allows for precise work and control of orders.*
- *The use of tools, i.e. drills, screwdrivers, vacuum cleaners that communicate with each other using wifi , Bluetooth. Various types of communicators*

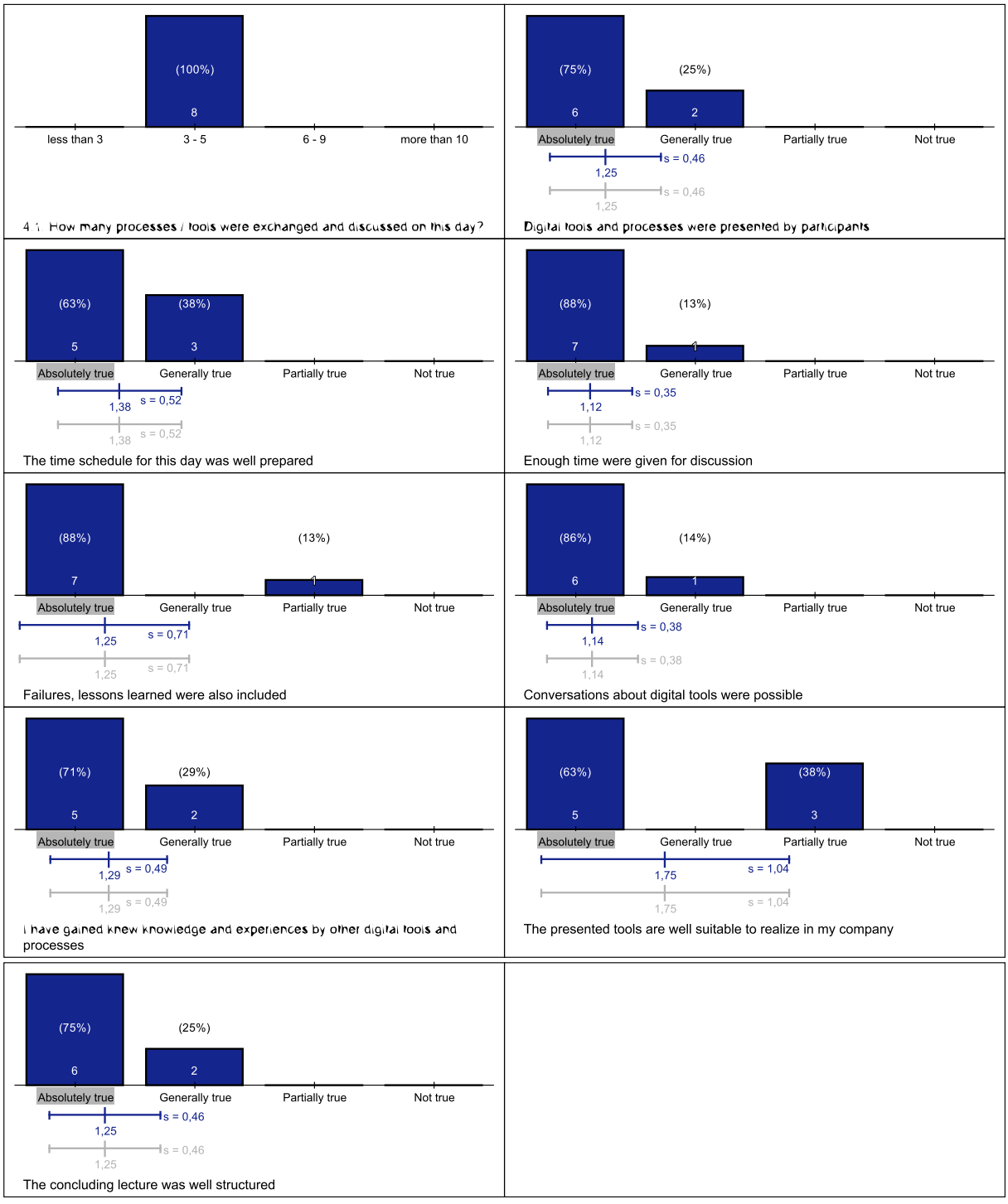
Evaluation of Learning on the job phase

Free form answers

What would you like to say to trainers? What could have done better, what should not be changed etc. Do you have any suggestions regarding the project phase?

- *Everything was fine (2 times)*
- *I have no objections*
- *I think the coach was very well prepared. No comments.*
- *No comments (3 times)*
- *Nothing, everything suited me*

Reporting und reflection phase (Reporting Day)



Free form answers

What would you like to say to the trainers? What could have done better, what should not be changed etc. Do you have any suggestions regarding the reporting day?

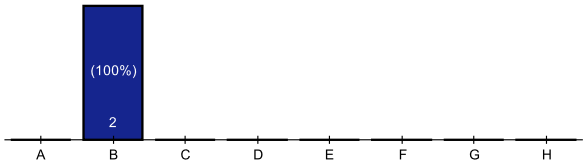
• *Everything was fine (2 times) / No comments (5 times) / Nothing, everything suited me*

Conclusion

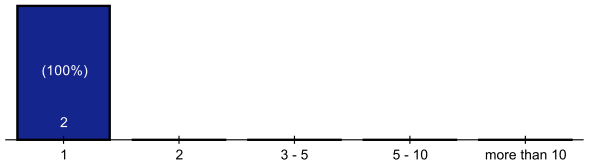
In summary, students generally expressed a high level of satisfaction with all courses, positively evaluated their own learning experience, as well as in the learning on the job phase. Participants has used digital technologies and tools and gained practical experiences.

Enterprises – Employers

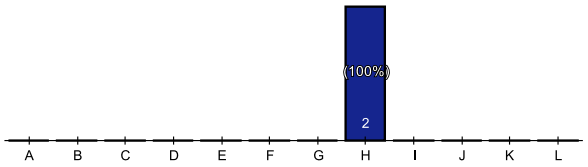
Involved polish enterprises



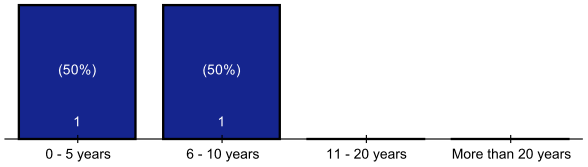
1.2. How many employees do your company have?
A 1-man-business (0)
B less than 10 (2)
C between 10 - 20 (0)
D between 20 - 50 (0)
E between 50 - 100 (0)
F between 100 - 500 (0)
G between 500 - 1000 (0)
H more than 1000 (0)



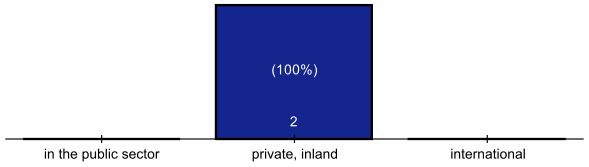
1.3. How many company locations do your company have?



1.4. In which branch are you active?
A Education and training (0)
B Consulting (0)
C Construction (0)
D Finishing (0)
E Electrician (0)
F Plumber (0)
G Architect (0)
H Construction Eng. (2)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)



1.5. Experience in the branch



1.6. Your company is

Prescription of applied digital working processes or tools in the company

• *During the training period, we used drones. We used them to monitor the progress of construction works and to inspect construction plans and facilities under construction. Their use has allowed us to better and more accurately control the construction works and, above all, their quality.*

• *In connection with the training, we tested thermal imaging cameras in order to improve the quality of our services. We used the camera to identify underfloor heating thermal bridges of the facilities - it will remain in our company for use*

Learning on the job phase

Free form answers

What would you like to say to trainers? What could have been done better, what should not be changed etc. Do you have any suggestions regarding the project phase?

• *Everything was clear and carried out in the right way*

• *Training carried out in an appropriate manner. No comments.*

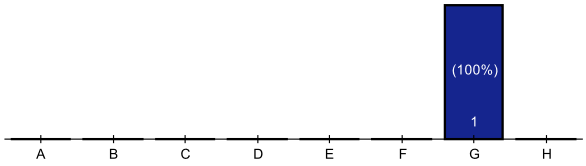
Conclusion

In Poland, the enterprises were very satisfied with the course in KAIN Method and found that the topics were up-to-date, interesting, and close to the needs of the participants. The tools, that were applied during the training were new skills as well as for the participants and for the companies.

Lecturers

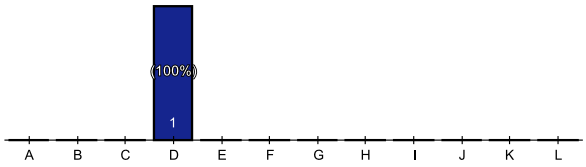
Demography

In Poland, one teacher completed the questionnaire. This lecturer was an entrepreneur in the finishing branch, having more than 20 years of experience in branch, and age between 30 and 60 years. According to him, the facilitations (place, time etc.) were excellent. The students also seemed to have required basic knowledge about the topic, they were helpful and respected each other and seemed to be satisfied with the lessons.

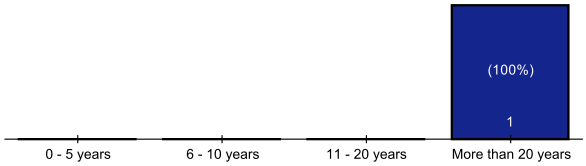


1.2. What is your highest education?
A Doctor or resp. (0)
B Master of Science (0)
C Bachelor (0)
D Master VET (0)
E Vocational Education (0)
F Matriculation Exam (0)
G Comprehensive School (1)
H None (0)

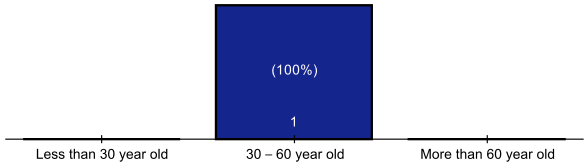
1.3. Employment: At the moment you are



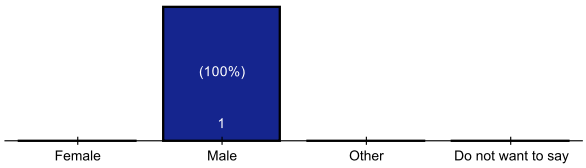
1.4. In which branch you are / were / will be working or studying
A Education and training (0)
B Consulting (0)
C Construction (0)
D Finishing (1)
E Electrician (0)
F Plumber (0)
G Architect (0)
H Construction Eng. (0)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)



1.5. Experience in the branch

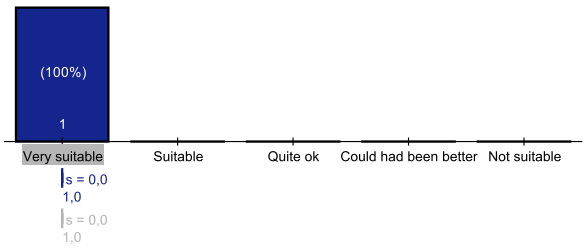


1.6. Age: At the moment you are

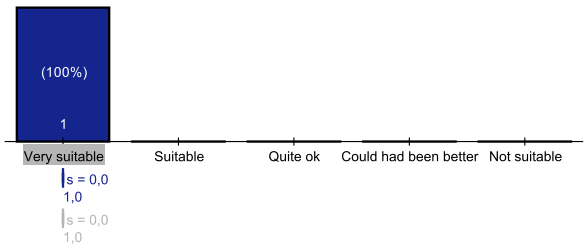


1.7. Gender: Are you

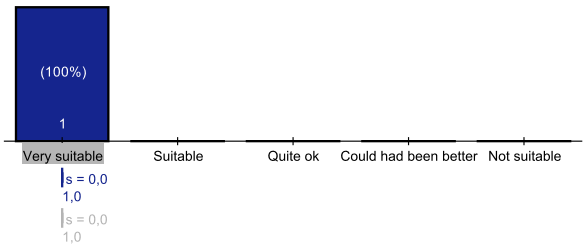
Educational Block



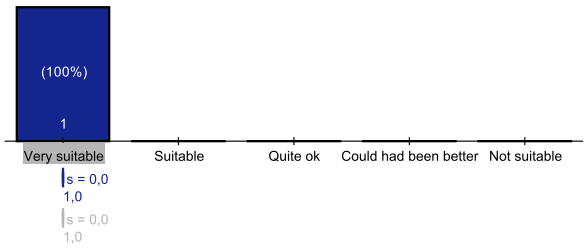
The Place for the Training was



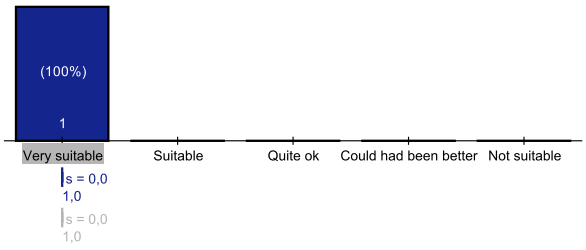
The time (Date) of the training was



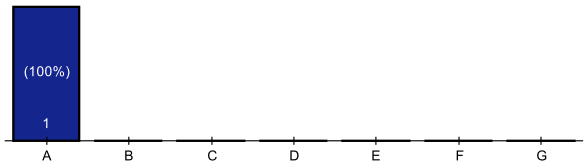
The length of the training was



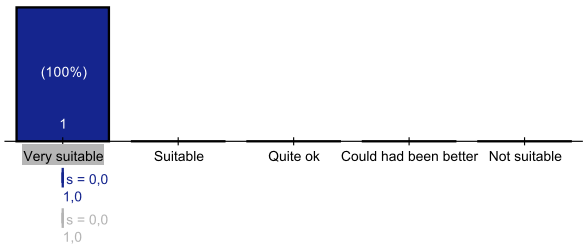
The schedule of the training was



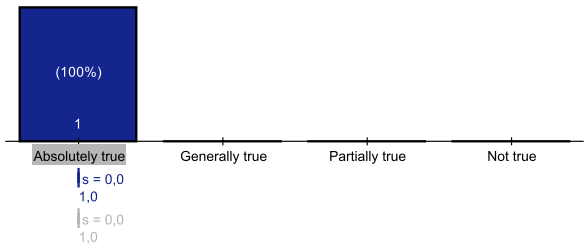
The facilitations (room, equipment etc) were



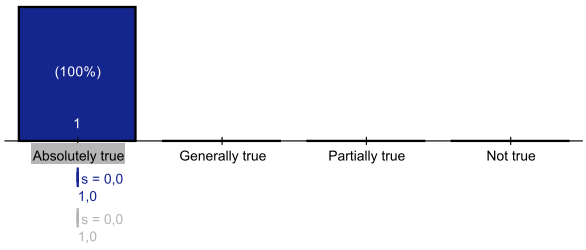
2.2. In common, the participants (5 choices max):
A Were interested and motivated in learning new methods (1)
B Had experience in their branch (0)
C Have participated in discussions (0)
D Had enough preknowledge (0)
E Were bored (0)
F Were not qualified enough for the course (0)
G Had no attention (0)



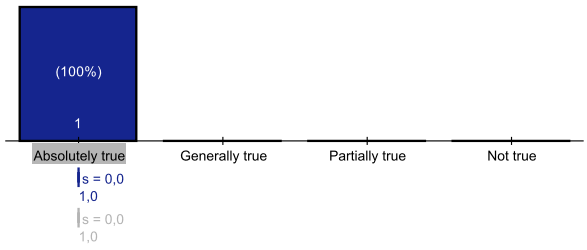
There was time enough for the topic



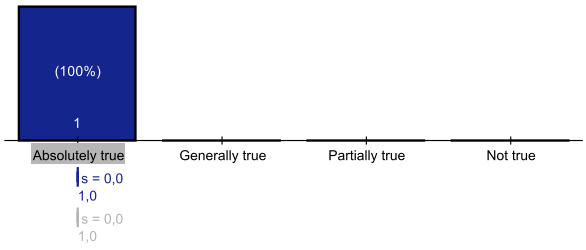
There was time enough for the discussion



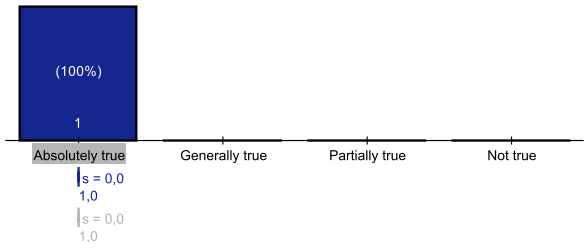
The tasks given were clear and understandable



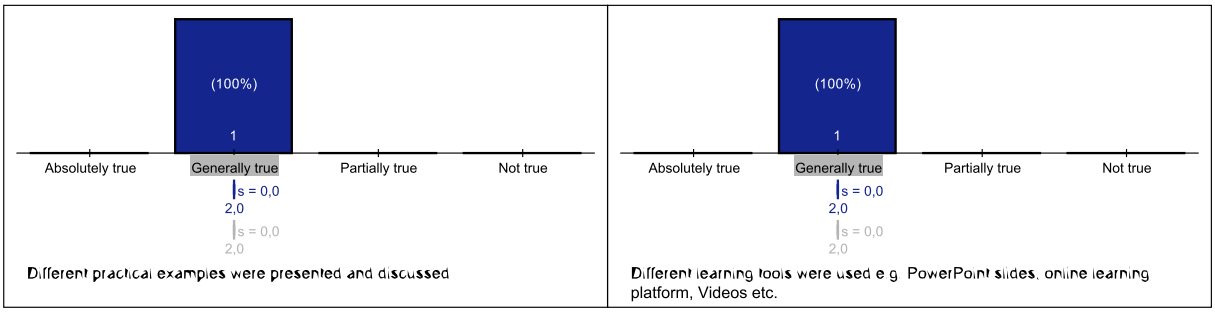
The atmosphere in the course / lessons was good and open.



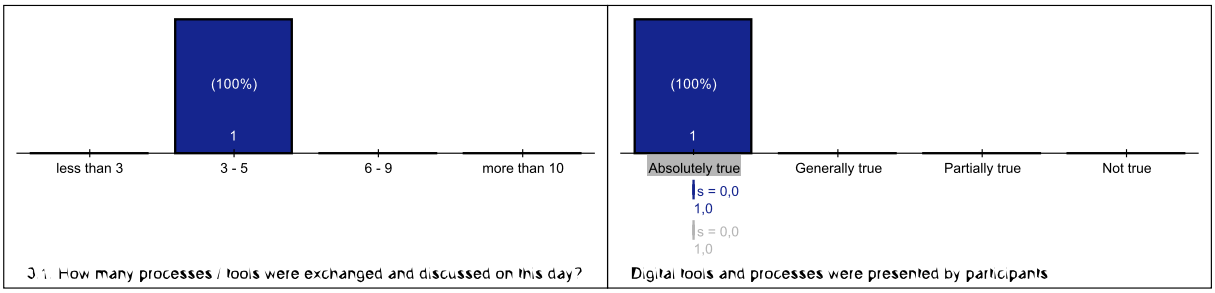
We had a good team spirit

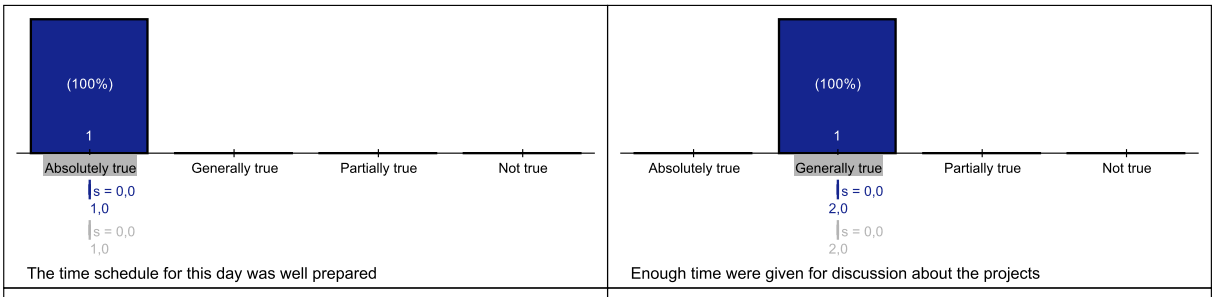


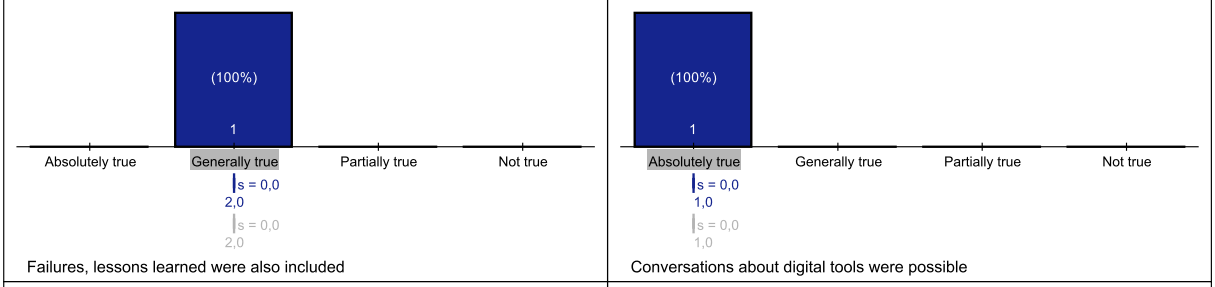
Different methods were used e.g. groupwork, discussion forum.

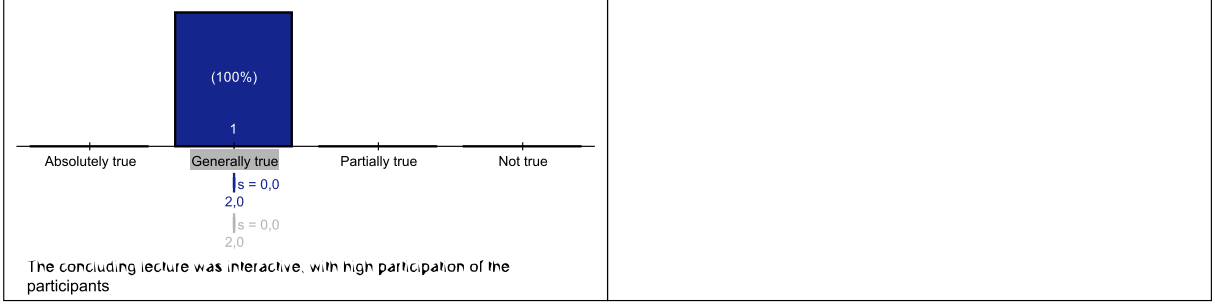


Reporting and reflection phase (Reporting day)









Free form answers

What could have done better, what should not be changed etc. Do you have any suggestions or lessons learned regarding the reporting day?

1. increase the range of interest in such training.

2. new tools for accelerating the implementation of construction works and relieving contractors were presented
3. the reporting day was conducted in a pleasant atmosphere and with the involvement of all participants
Conclusion

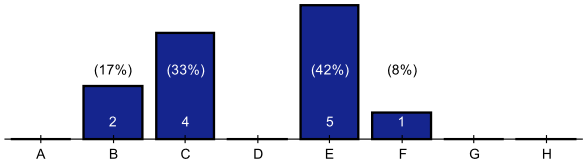
As a conclusion it can be said that implementation of the course was successful and efficient.

Hungary

Participants – Students

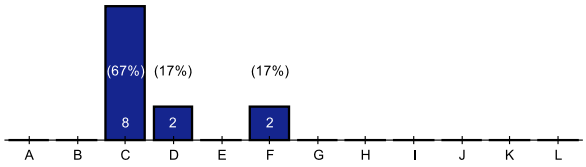
Demography

The evaluation survey was responded to by all 12 students who participated the course. 4 students were under the age of 30, 8 participants between 30 and 60 years old. In terms of gender representation, males dominated the sample with proportion of 75%, while females comprised the remaining portion, 25%. Regarding employment status, all students were being employed and working at a company. Overall, the feedback on facilitations reveals a generally positive perception among students, with a majority rating various aspects as “suitable” or “very suitable.” Students positively assessed the place, the length, and the schedule of the training as well as the facilitations such as room and equipment.

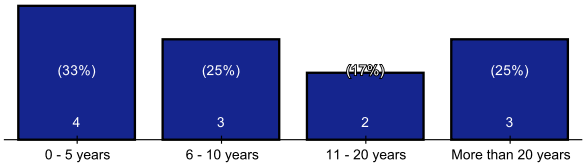


1.2. What is your highest education?
A Doctor or resp. (0)
B Master of Science (2)
C Bachelor (4)
D Master VET (0)
E Vocational Education (5)
F Matriculation Exam (1)
G Comprehensive School (0)
H None (0)

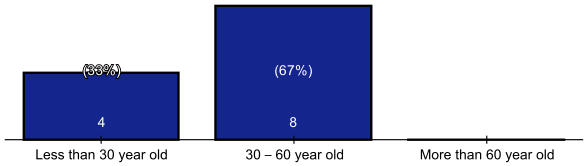
1.3. Employment: At the moment you are



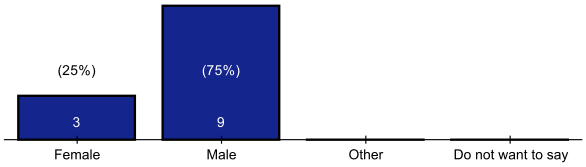
1.4. In which branch you are / were / will be working or studying
A Education and training (0)
B Consulting (0)
C Construction (8)
D Finishing (2)
E Electrician (0)
F Plumber (2)
G Architect (0)
H Construction Eng. (0)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)



1.5. Experience in the branch

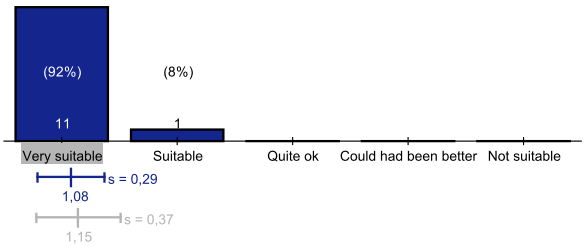


1.6. Age: At the moment you are

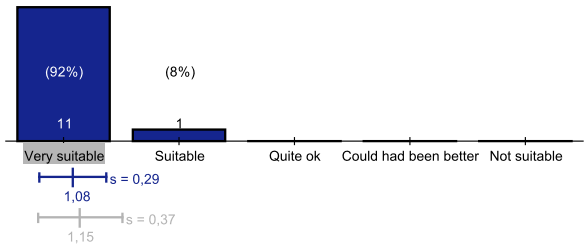


1.7. Gender: Are you

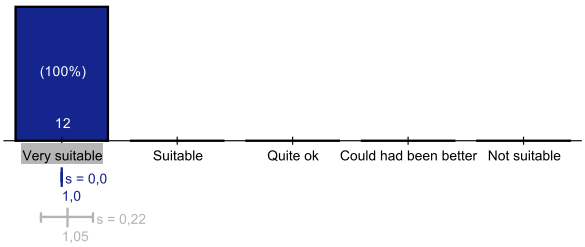
Educational Block



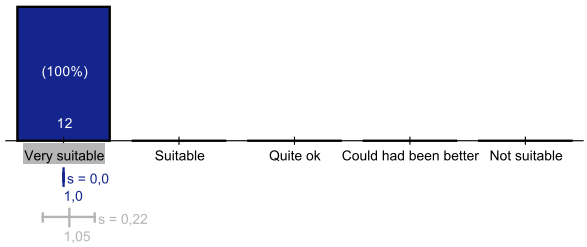
The Place for the Training was



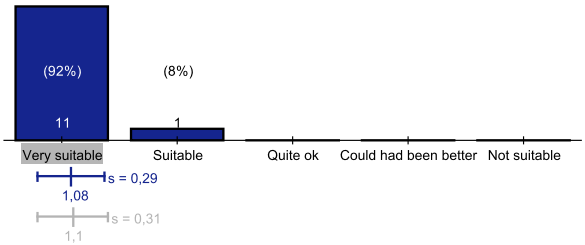
The time (Date) of the training was



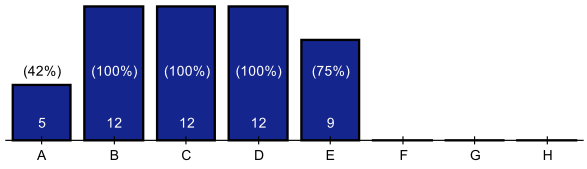
The length of the training was



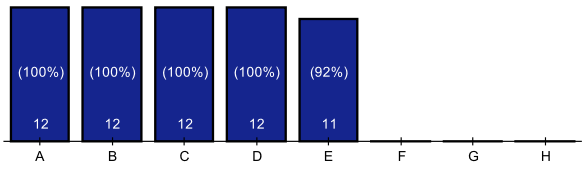
The schedule of the training was



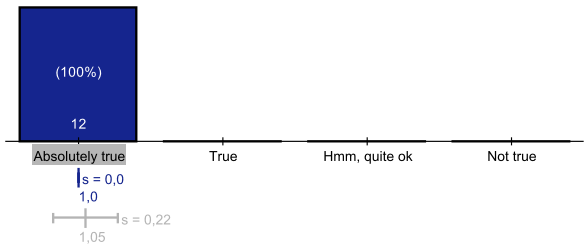
The facilitations (room, equipment etc) were



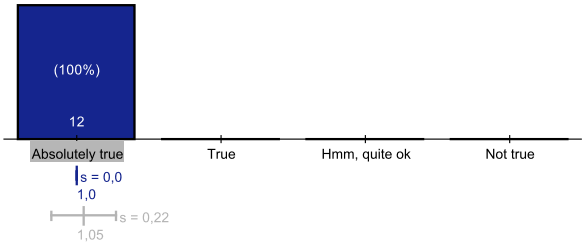
2.2. In common, the topics were (5 choices max):
A Topical (5)
B Interesting (12)
C Important (12)
D Close to my needs (12)
E Up to date (9)
F Boring (0)
G Out-of-date (0)
H Unnecessary (0)



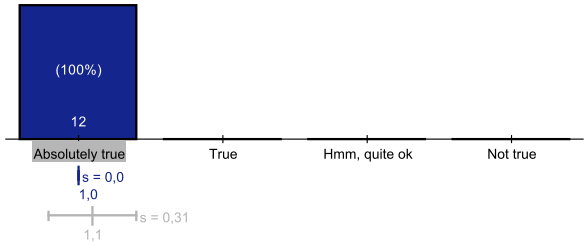
2.3. In common, the teachers (5 choices max):
A Used interesting and motivating methods (12)
B Dealt with important topics (12)
C Were professionals in their branch (12)
D Met the expectations (12)
E Were up-to-date (11)
F Were boring (0)
G Were out-of-date (0)
H Wandered off the point (0)



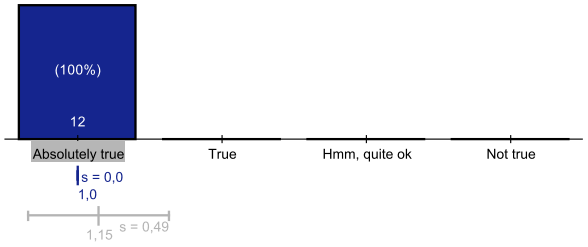
The information given was up-to-date



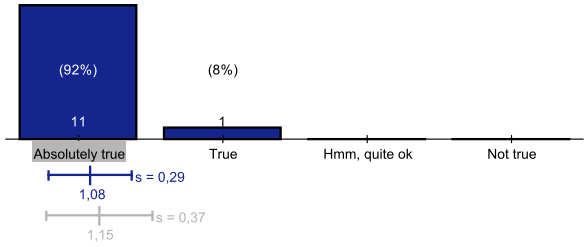
The presentation was clear and understandable



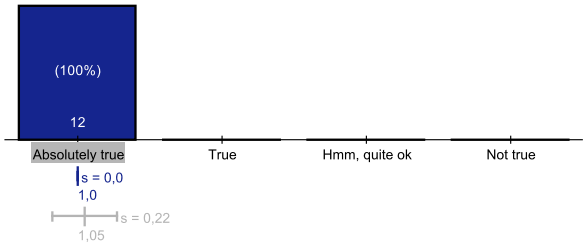
There was time enough for the topic



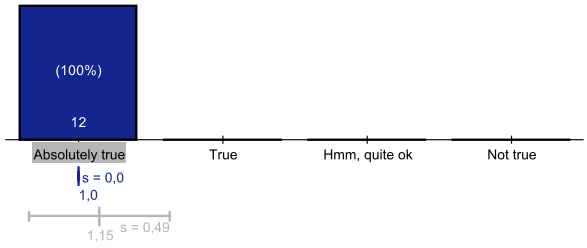
There was time enough for discussion



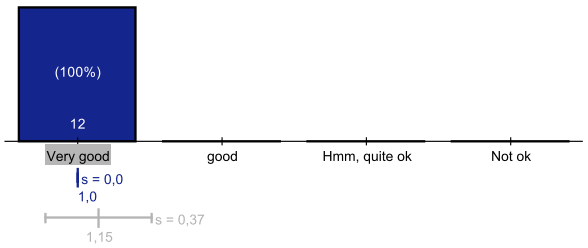
The tasks given were clear and understandable



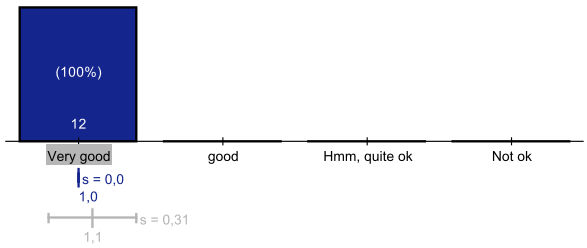
The atmosphere in the course / lessons was good and open.



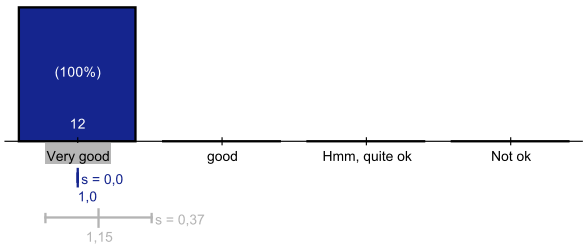
We had a good team spirit



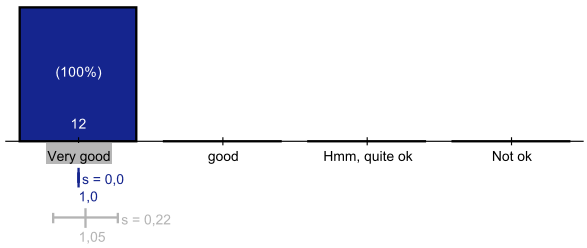
Course structure



Used tools and Resources (Presentation, black board notes, digital tools)

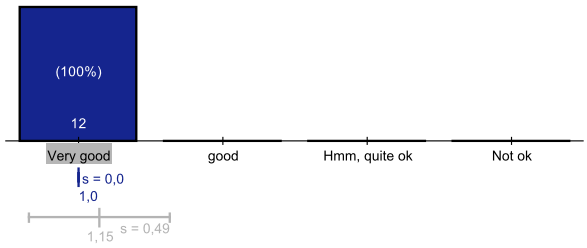


Learning Materials (Script, Handouts)



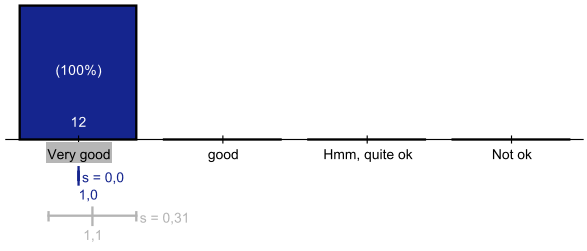
Quality of study course in summary

Course content overview

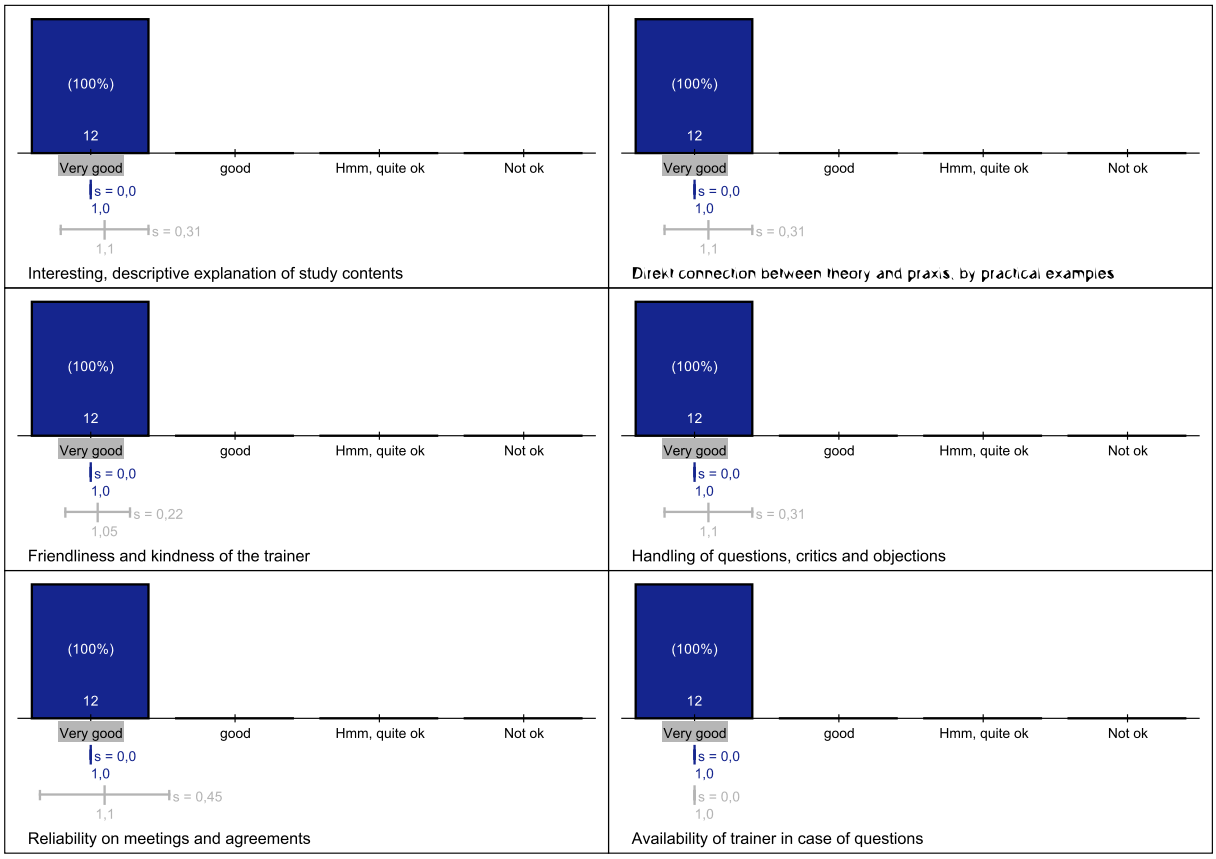


Estimated time for the lessons

Scope of teaching content



Study method fits to the content (Groupwork, discussion forum)



Prescription of applied digital working processes or tools

- A good number of the people working in production are not proficient in reading drawings made in CAD, and therefore some of our employees will take part in further training in an organized manner. According to the plans, this will be the precondition for making their compensation more favorable.
  For these trainings, we also count on the help of EDIHs operating in Hungary. We present our products in a catalog on our website maintained by an external developer. We have made significant improvements and changes in its structure.
- Digitization of invoice tracking
  For years, our company struggled with serious challenges in the field of recording and collecting accounts receivable. At the same time, we have many open projects in various states of readiness, even with a lead time of several years. Clients have paid late or not at all for our services. This caused us financial difficulties and consumed a lot of time and energy.
  The breakthrough for us was the introduction of Számlázz.hu online bank income tracking services. At the instructor's suggestion, we subscribed to this online service, which allowed us to track incoming and unpaid payments in real time, so we could immediately see which invoices hadn't been paid yet. And the sending of automated notifications and reminders greatly facilitated the collection process, reducing the number of defaults.

- DirectMail (Mailchimp, Outlook circular) and with a tele-sales supplement. We make the finished products and existing plans available to registered interested parties in a cloud storage (Gdrive, OneDrive...)
- I am very happy that several of my colleagues will participate in CAD training. Unique product development is starting to play a much bigger role in the company's activities. Our renewed website is also an important steppingstone in this regard.
- In his own answer, my colleague very well presented the new collaboration method through Viber that the company uses. As a relatively older employee, learning this new collaboration method was not difficult for me either, I quickly learned to use it.
- Ltd. plans to maintain a monitored chat community on social media where sports hall operators can share their experiences. The company's specialists can monitor some of the problems and thus they are not permanently separated from those who temporarily pause their maintenance subscription. In the future, if this forum becomes stronger, we also plan to introduce an advanced level of counseling on this platform.
- Since the introduction of the online automated invoicing system introduced by my father, we are more relaxed about the finances of our business. Contact with customers has also become smoother, as financial issues can be clarified immediately thanks to accurate and transparent records. The services of Számlázz.hu not only made the company's operation easier, but also reduced the stress level, which resulted in a noticeable improvement in everyday work.
  This digitization solution will continue to be an indispensable tool for the successful operation of the family business in the future.
- To support administrative activities, the company subscribes to a Microsoft 365 service, which provides a secure cloud storage location, professional mail and Teams services, and the use of some legal software. Among other things, we hope that this will make the company's data assets much more secure.
- We have learned and identified that a significant part of the problems that arise during construction can be traced back to insufficient communication.
- We distinguished the following problems:
  - Information arrives late
  - One of the characters is left out
  - The decisions are not clear.
- We have introduced a new way of working:
  At the start of each project, we create a new Viber group to which we invite our own colleagues, as well as the engineering colleagues and the designer.
  For each phase of the work, when necessary, we conduct a group video call, where we discuss the major events of the construction project.
  If any design changes, the designer will also publish it on this free platform. All problems are documented here, and we decide together how to fix the error. The introduction of the new digital collaboration method significantly improved both the collaboration and the mood by making conflicts less likely to cause unexplored tensions.
- We have taken the first steps to spread the awareness and value of our brand and business more widely.
  I try to present myself as an expert, my business in social media.

I plan to publish the content related to painting on my Instagram by regularly posting results and references, while I plan to publish the clips introducing the tricks of insulation on Facebook and Tiktok. We start the campaigns with a modest payment plan.

- We will involve young designers and child psychologists from specialized higher education institutions in the creation of the world of shapes and colors of children's furniture.
  Design tenders are conducted electronically using social media platforms. We will continuously publish on social media about the development process and the involved experts.
  In order to make it easier to modify, we want to replace the currently used design on paper with a furniture design program that is also suitable for 3D presentation (eg: Piper, ms_Bútorrózsena, PolyBoard...).
  For this, we have started acquiring the necessary knowledge.

Evaluation of Learning on the job phase

Free form answers

What would you like to say to trainers? What could have been done better, what should not be changed etc. Do you have any suggestions regarding the project phase?

- *I am looking forward to when they started developments will be completed and what effect they will have on our company's turnover. (2 Mal)*
- *Thank you very much for your help and openness.*

Reporting und reflection phase (Reporting Day)

Free form answers

What would you like to say to the trainers? What could have been done better, what should not be changed etc. Do you have any suggestions regarding the reporting day?

- *The company's management is also interested in free training for businesses that IPOSZ and DigitalTech EDIH will jointly organize in the region. There are several of these training courses that fit perfectly with our development and HR policy goals.*

• *The extensive information we received from the IPOSZ during this training was very helpful. It will be a big task to find the right people and experts for each development area.*

Conclusion

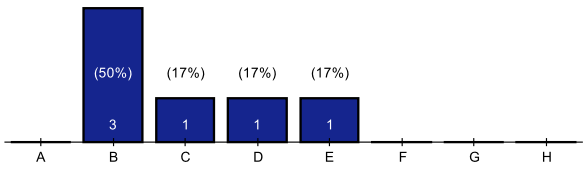
In summary students generally express high levels of satisfaction with all courses appreciating their content, importance and relevance of the given information.

Enterprises – Employers

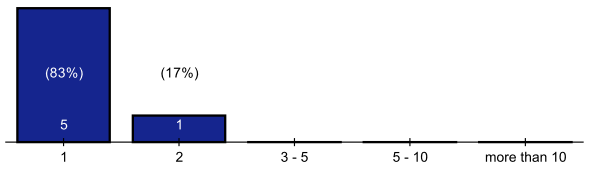
Involved Hungarian enterprises

6 Hungarian enterprises completed the questionnaire. 3 of them are very small companies with less than 10 employees, one had between 10 and 20 employees, another had between 20 and 50 and one had between 50 - 100 employees. All of the companies are private inland enterprises and are from the construction industry, with a wide range of experience in the branch, from less the 5 years to more than 20 years of experience.

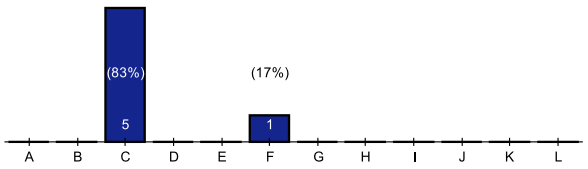
The persons who participated the course were very satisfied. The topics the course dealt with were considered to be topical, up-to-date, important, and interesting. The place, time, length, and schedule of the training were considered to be either excellent or good. On point of view of the company, the course was seen beneficial, and participants were satisfied with it.



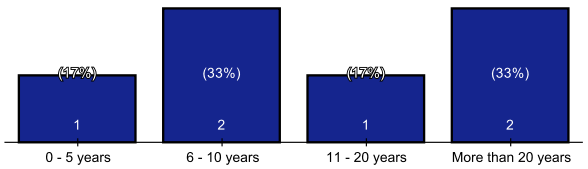
1.2. How many employees do your company have?
A 1-man-business (0)
B less than 10 (3)
C between 10 - 20 (1)
D between 20 - 50 (1)
E between 50 - 100 (1)
F between 100 - 500 (0)
G between 500 - 1000 (0)
H more than 1000 (0)



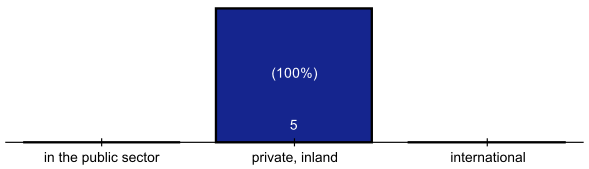
1.3. How many company locations do your company have?



1.4. In which branch are you active?
A Education and training (0)
B Consulting (0)
C Construction (5)
D Finishing (0)
E Electrician (0)
F Plumber (1)
G Architect (0)
H Construction Eng. (0)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)



1.5. Experience in the branch



1.6. Your company is

Prescription of applied digital working processes or tools in the company

1. *A good part of the people working in production are not proficient in reading drawings made in CAD, and therefore some of our employees will take part in further training in an organized manner. According to the plans, this will be the precondition for making their compensation more favorable.*
2. *For these trainings, we also count on the help of EDIHs operating in Hungary. I am very happy that several of my colleagues will participate in CAD training. Unique product development is starting to play a much bigger role in the company's activities. Our renewed website is also an important steppingstone in this regard. We present our products in a catalog on our website maintained by an external developer. We have made significant improvements and changes in its structure.*
3. *Digitization of invoice tracking*

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4. *Ltd. plans to maintain a monitored chat community on social media where sports hall operators can share their experiences. The company's specialists can monitor some of the problems and thus they are not permanently separated from those who temporarily pause their maintenance subscription. In the future, if this forum becomes stronger, we also plan to introduce an advanced level of counseling on this platform. The company's management is also interested in free training for businesses, which IPOSZ and DigitalTech EDIH jointly organize in the region.*

5. *We have learned and identified that a significant part of the problems that arise during construction can be traced back to insufficient communication. We distinguished the following problems:*

    - *Information arrives late*
    - *One of the characters is left out*
    - *The decisions are not clear.*

    We have introduced a new way of working:

    At the start of each project, we create a new Viber group to which we invite our own colleagues, as well as the engineering colleagues and the designer. For each phase of the work, when necessary, we conduct a group video call, where we discuss the major events of the construction project. If any design changes, the designer will also publish it on this free platform. All problems are documented here and we decide together how to fix the error.
    The introduction of the new digital collaboration method significantly improved both the collaboration and the mood by making conflicts less likely to cause unexplored tensions. Learning collaboration platforms such as Viber was no problem for older colleagues either.

6. *We have taken the first steps to spread the awareness and value of our brand and business more widely. I try to present myself as an expert, my business in social media. I plan to publish the content related to painting on my Instagram by regularly posting results and references, while I plan to publish the clips introducing the tricks of insulation on Facebook and Tiktok. We start the campaigns with a modest payment plan. To support administrative activities, the company subscribes to a Microsoft 365 service, which provides a secure cloud storage location, professional mail and Teams services, and the*

use of some legal software. Among other things, we hope that this will make the company's data assets much more secure.

7. *We will involve young designers and child psychologists from specialized higher education institutions in the creation of the world of shapes and colors of children's furniture. - Design tenders are conducted electronically using social media platforms. We will continuously publish on social media about the development process and the involved experts.*
   In order to make it easier to modify, we want to replace the currently used design on paper with a furniture design program that is also suitable for 3D presentation (eg: Piper, ms_Bútorrózsena, PolyBoard...). For this, we have started acquiring the necessary knowledge.
   There are already some more brand-building video clips on Facebook and Tiktok, but based on the instructor's suggestion, they will be posted more as personal interviews, aimed at professional interested parties. We have created a national customer database, whom we want to contact in DirectMail with a tele-sales supplement. We make the finished products and plans available to registered interested parties in cloud storage (Gdrive, OneDrive...).

Learning on the job phase

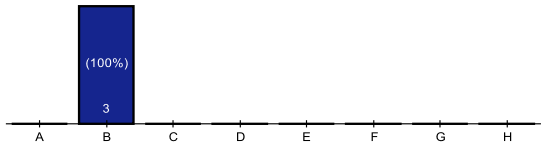
Conclusion

As a conclusion it can be said that both the employers and employees gained beneficial information and skills during the course, which was well implemented, also considering the place, time, and other facilitations.

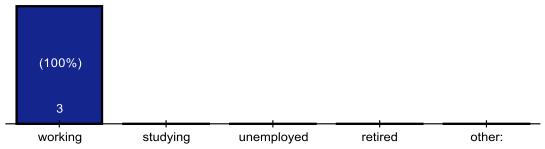
Lecturers

Demography

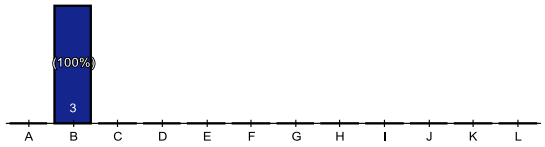
The evaluation survey received responses from all three lecturers who taught the courses in the educational blocks and at the reporting day All lecturers fell within the age range of 30 to 60 years old. Regarding profession, all lecturers identified themselves as being active in consulting.



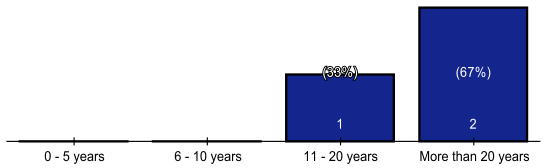
1.2. What is your highest education?
A Doctor or resp. (0)
B Master of Science (3)
C Bachelor (0)
D Master VET (0)
E Vocational Education (0)
F Matriculation Exam (0)
G Comprehensive School (0)
H None (0)



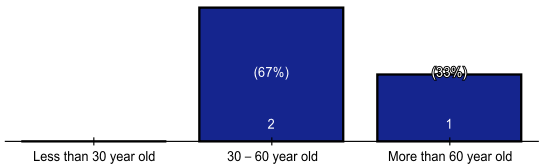
1.3. Employment: At the moment you are



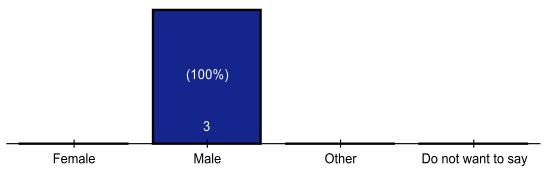
1.4. In which branch you are / were / will be working or studying
A Education and training (0)
B Consulting (3)
C Construction (0)
D Finishing (0)
E Electrician (0)
F Plumber (0)
G Architect (0)
H Construction Eng. (0)
I Electrical Eng. (0)
J Piping Eng. (0)
K Public Authority (0)
L Other: (0)



1.5. Experience in the branch

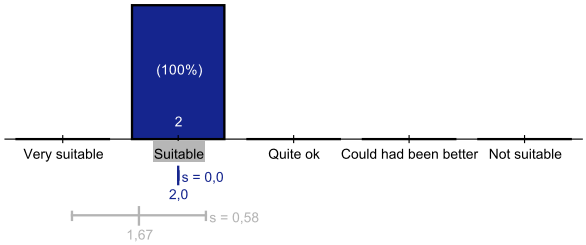


1.6. Age: At the moment you are

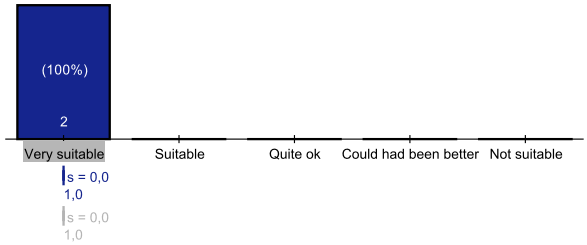


1.7. Gender: Are you

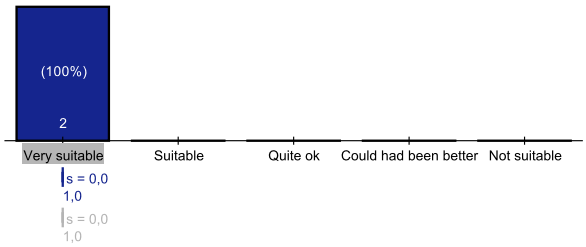
Educational Block



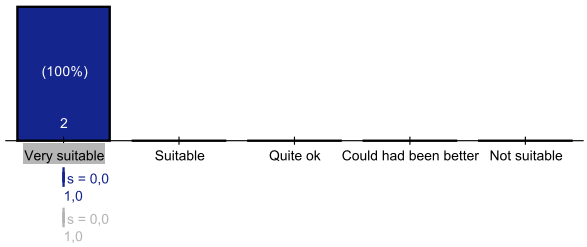
The Place for the Training was



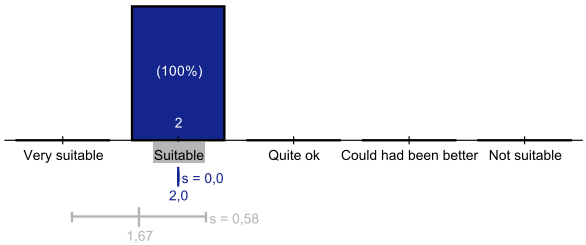
The time (Date) of the training was



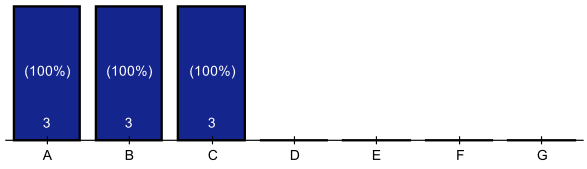
The length of the training was



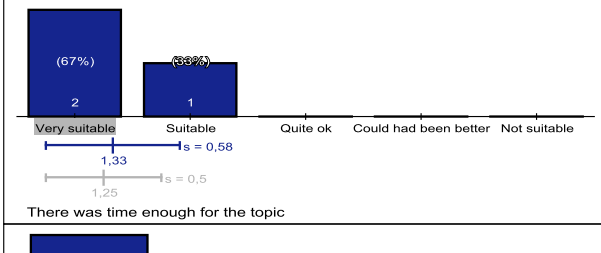
The schedule of the training was



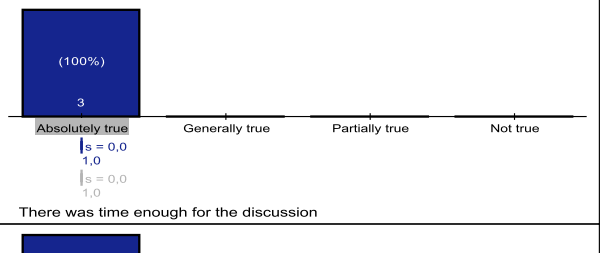
The facilitations (room, equipment etc) were



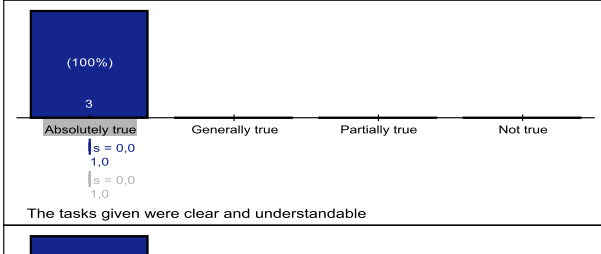
2.2. In common, the participants (5 choices max):
A Were interested and motivated in learning new methods (3)
B Had experience in their branch (3)
C Have participated in discussions (3)
D Had enough preknowledge (0)
E Were bored (0)
F Were not qualified enough for the course (0)
G Had no attention (0)



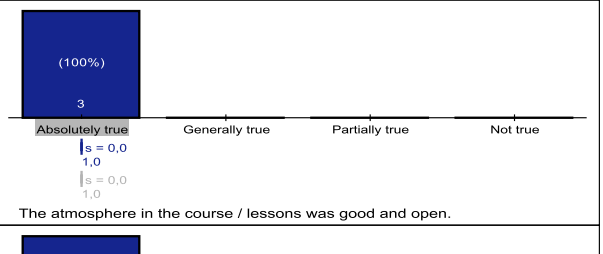
There was time enough for the topic



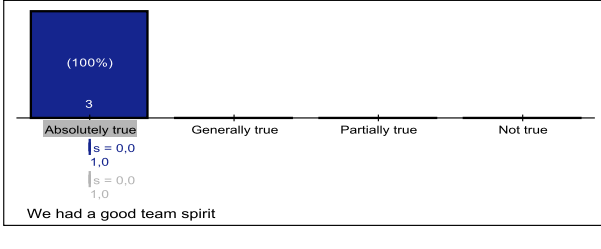
There was time enough for the discussion



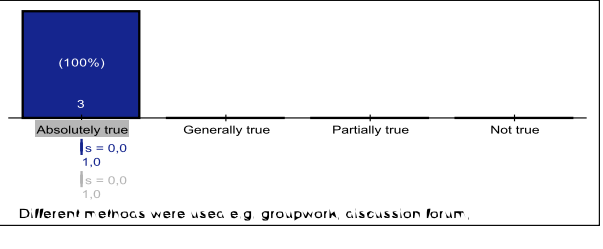
The tasks given were clear and understandable



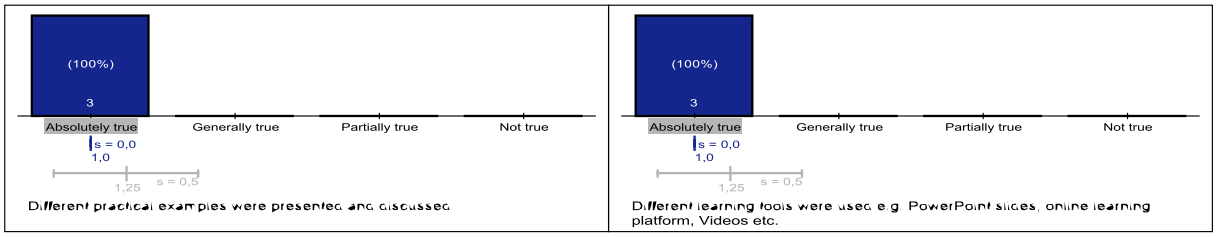
The atmosphere in the course / lessons was good and open.



We had a good team spirit



Different methods were used e.g. groupwork, discussion forum

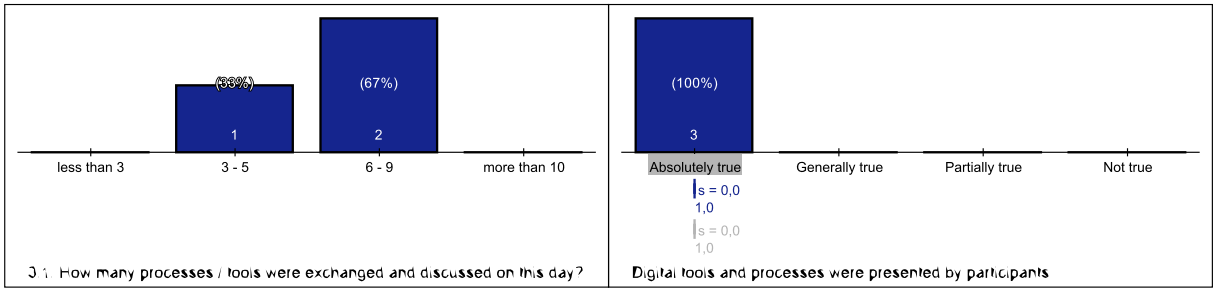


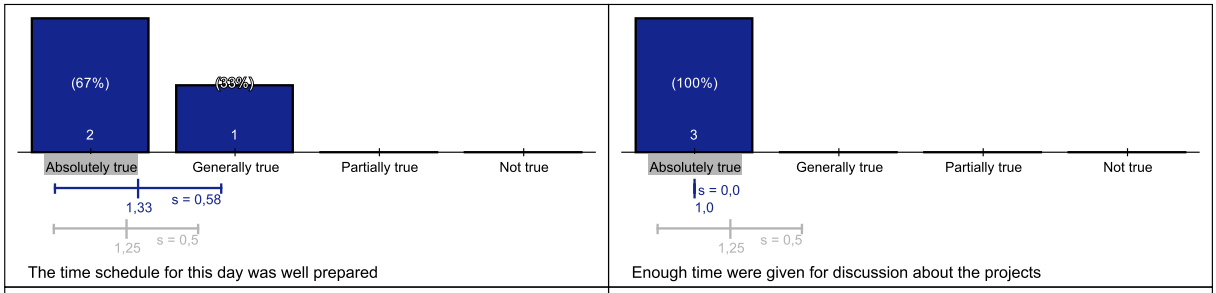
Free form answers

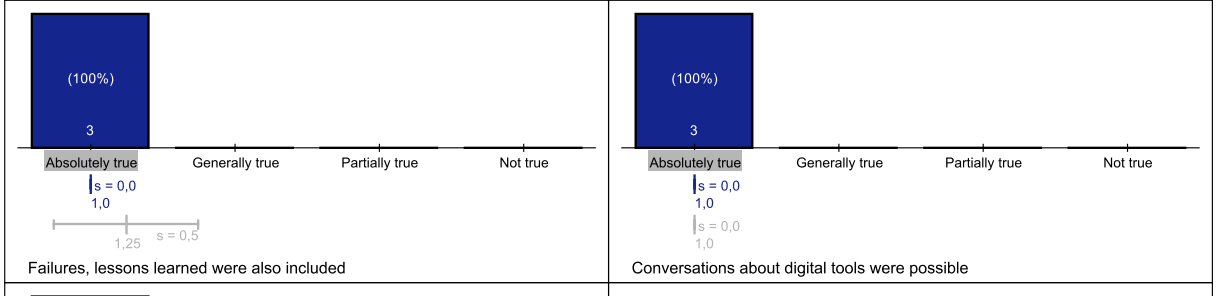
What could have been done better, what should not be changed etc. Do you have any suggestions or lessons learned for improving the spatial and/or technical equipment?

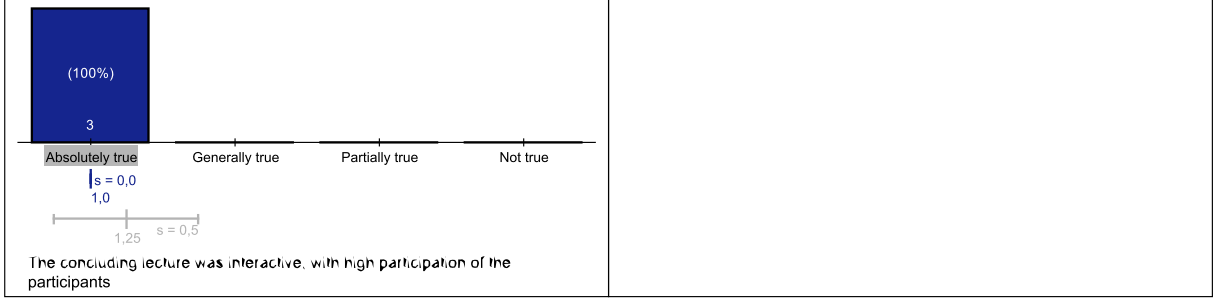
• *It is very difficult in today's world to train construction companies. They have a lot of work and are often full of orders for months in advance. At the same time, they still require professional information and to be able to meet managers of businesses similar to them. If you finally succeed in getting 10-15 construction entrepreneurs to sit down for a training session, it is already a guarantee that the training will have a good atmosphere with a significant force of cohesion.*

Reporting and reflection phase (Reporting day)









Free form answers

What could have been done better, what should not be changed etc. Do you have any suggestions or lessons learned regarding the reporting day?

• Even sending an e-mail or sending out a price offer is a form of digitization.

Today, information technology permeates all areas of industry, including the construction industry. Who uses these tools, how much, and to what extent depends on the activity and size of the business. Perhaps we have over mystified the whole digitization, and now everyone thinks that it is something really difficult and complicated. It's not! If we just think about how many things an average person or an entrepreneur does digitally, starting from communicating with someone via a smart device, or sharing pictures with loved ones, or searching for an item on the Internet, or placing an order. So there are a lot of things that we don't even think about, but that's digitization.

• If permitted, I would like to summarize the experience of the training in a few words.

During the training, we reviewed an extremely wide range of digital solutions and adapted them to the needs of the participating businesses.

There are businesses and small entrepreneurs who appear in some form on social media channels (Facebook, Tik-Tok, Youtube). On the one hand, they upload reference material about themselves, present their activities, present their finished works, and on the other hand, give expert advice. Consulting is - in marketing terms - also a kind of branding, which practically increases the value of the company and thus allows them to achieve a higher price. If someone can already produce such content, then they obviously have digital tools and know how to use them.

In order for an entrepreneur to be able to operate, quite a few things must be met e.g. invoices are generated, you must also create contracts. Contracts and offers are typically prepared with a text editing program. You can edit your own, but there are countless platforms from which contract samples can be downloaded. The entrepreneur customizes the downloaded contract and then sends or shares it with the client. This is yet another level of digitization.

There are cases when a contract requires more than one person, i.e. it is necessary to collaborate, to communicate on a platform that is accessible to everyone.

But in order to be able to make an offer, the entrepreneur needs broader digital skills. It doesn't matter whether you receive the floor plan on paper or in PDF format or in 3D to prepare an offer. The vast majority of designers already make digitized drawings and not only in two, but also in three dimensions.

There is brilliant software, also developed in Hungary, which are suitable for reading the data from a rangefinder, and this particular software puts together the floor plan, on which calculations can then be made.

When we talk about the smallest businesses, these are the most important platforms. It's a little different for big companies.

Enterprises performing larger, more complex activities - e.g. general contractors - they already maintain collaboration spaces and target software that also have their own document library.

In the case of a larger company, there are also logistical tasks that must be handled, in this case calendar systems must be put together to determine when the supplier actually arrives and when the contractor arrives, the time windows must be optimized and put together. There are now target software for this.

• In the professions that are facing more and more challenges, if at some point the execution does not go as planned, then it has to be repaired, which costs a lot of money.

Coordination, communication, maintaining digital contact with each other is very important. It is important that professions know and be able to use these platforms.

When we talk about a smart apartment, there is an automatic system between the sensors and the switches, for which representatives of various professions must be

trained. Those responsible for smart home solutions must also work together with representatives of even more traditional craft trades so that each piece can work properly.

Conclusion

Overall, the feedback from lecturers provides valuable insights for improving curriculum delivery and student engagement in future courses. All lecturers agreed on the relevance and interest of course topics, the suitability of facilitations and noted students' active engagement.

Conclusions and recommendations for future development

The implementations of test courses were successful. Participants, teachers and enterprises were satisfied with the results. The skills and knowledge the training gave to participants were found to be beneficial both for participants and their employers. From the evaluation results, some improvements let be made. If the implement contains many topics and many separate sub-courses, it is recommended that the schedule will be paid more attention, and more time will be reserved for both teaching and discussion. Furthermore, the wider the implementation is, the more recommendable it is to have more teachers. The topics are so wide that it will be very hard for one teacher to prepare and lecture on all the topics.

Appendices

Appendix A The template of the questionnaire for participants of training	
Appendix B The template of the questionnaire for training lecturers	
Appendix C The template of the questionnaire for companies that KAIN method related projects were carried out in	