



A Digitisation strategy and capacity building guidelines for VET institutions



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1. PREFACE

Innovative economies need people with skills who are able to adapt to changing conditions, improve existing solutions and generate new ideas, and learn new skills.

A country's government must create conditions and support a system in which citizens can develop these competencies and skills. This is the only way to remain competitive.

This publication contains conclusions drawn in the course of many discussions and workshops during project implementation to promote digitisation in vocational education and training.

At the same time, it should be emphasized that the implementation of the DigiCon project took place practically throughout the period of major restrictions as a result of the pandemic crisis (online consultations, limited opportunities for face-to-face meetings, etc.). This meant a more difficult, but also newly reflected view on the elaboration of our digitisation concepts. In general, it should be emphasized that the culture of dealing with technological innovations has improved. The awareness of the educational actors for the necessity of modernisation of the previous methodology and didactics has also improved significantly.

Nowadays, the institutions responsible for imparting vocational skills generally no longer ask themselves whether schools/colleges should be further digitised. This has now become a matter of course.

However, the digitisation of vocational training and higher education requires not only the development of digital educational offerings and closer cooperation between educational institutions at different levels, but also the strengthening of their technical, human and financial capacities.

Fortunately, there are numerous research studies, publications by economic institutes, ministries of education, etc. that have addressed the digitisation of vocational education and training and from which important findings can thus be taken (see recommended literature & sources).

The current challenge is now considered to be process management and capacity building of competent VET institutions as well as the promotion of resources among small and medium-sized enterprises to ensure digitisation.

Our proposals are therefore based on the jointly collected experiences of three EU countries (BE/DE/PL), from the development of innovative and at the same time practice-oriented digital tools. They include, among other things, examples of the concrete options for implementation in a vocational school, exemplarily related to the construction professions.

The partners agree that the digitisation processes in vocational education and training must be managed in such a way that they do not only take place in the form of technical solutions as a virtual vocational school/virtual university.

Hand in hand with technical approaches to solutions, the teaching of social skills must also go hand in hand and complement it (confident, critical and responsible use of digital technologies; critical thinking). Furthermore, the cooperation of various educational stakeholders must be intensified.

In connection with capacity building concepts, digitisation strategies for vocational education and training (initial and continuing training) should take into account the diversity of different

aspects and not be reduced to purely technical approaches to solutions.

We consider the digitisation strategy proposals as a contribution to adapting existing solutions for teaching digital and transversal competences and improving the capacity building of vocational training institutions.

Although the implementation of innovations can be considered a fundamental source of development for companies and individual countries, it must not become an objective in itself. Technological as well as organisational, administrative and social changes must be duly considered.

2. GENERAL SITUATION

Level of digitisation in the partner countries

For the analysis of the initial situation per country, the project partners focused on the following aspects:



In Poland, a national EQAVET reference point has been established, operating at the Education Development Centre in Warsaw. The point deals with the implementation of the EQAVET framework to support measures of the quality assurance process in VET (measurement tools, effectiveness and identification of areas for improvement). This also refers to the willingness to actively promote digital VET systems and to support educational institutions in advancing digitalisation in their institutions.

An Integrated Education Platform was created with universally available and modern electronic educational resources.

In vocational education, multimedia materials were placed on the platform, for learning a foreign language as well as for the usage of multimedia materials for career guidance (e.g. films and quizzes, professional kits for individual professions in specific sectors).

External promoters (including individuals) can provide these innovations with free vocational education materials.

Vocational schools participate in the programme called Nationwide Network Edukacyjna (OSE) provides fast and free access and secure internet to schools from all over the country.

OSE is a response to the challenges of modern education - shaping digital competences and open to modern technologies.

In addition, the measures should promote gender balance in traditionally "male" professions (e.g. in construction) and counteract the stereotypes of "female/male professions".

The multimedia materials developed so far, e.g. for career guidance, do not contain any references to the respective occupation being typically male or female.



In the area of higher education institutions, there is no uniform digitisation strategy, which is partly due to Germany's federal structure and the autonomy of each individual higher education institution. However, there is an intensive exchange between higher education institutions on digitisation in teaching and research.

A well-known platform for this is the Higher Education Forum on Digitisation:
<https://hochschulforumdigitalisierung.de>

At HTW Berlin, digitalisation in teaching and administration has been actively promoted for years. Numerous administrative processes are handled exclusively digitally in the so-called service portal. These include, for example, the accounting of business trips, administration of access authorisations and applications for further education measures. The general descriptions of processes using process diagrams take place in the so-called process portal of the HTW, which is embedded in an administration wiki (see the following example).

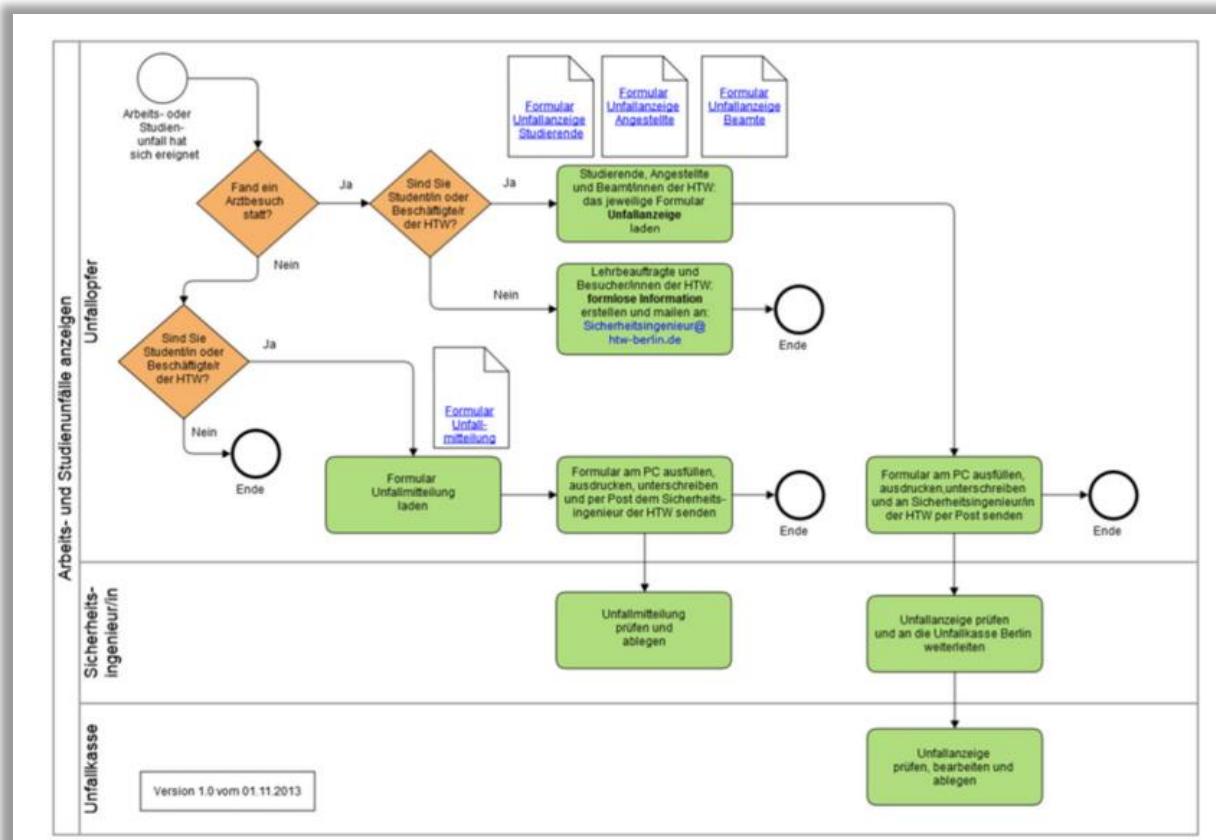


Illustration: Example process "Display work and study accidents" (Quelle: <https://www.htwberlin.de/einrichtungen/zentrale-referate/hochschulentwicklung-qualitaetsmanagement/prozessportal/>)

The organisation of teaching (e.g. description of events, people, rooms, timetables), which also includes the posting of grades, is carried out via the Campus Management System (<https://lsf.htwberlin.de/>).

MOODLE is used as the learning platform (<https://moodle.htw-berlin.de/login/index.php>). Teachers have the opportunity to make learning materials (including scripts, videos, podcasts, etc.) available for each course. In addition, e-exams or e-tests can be carried out. The web conferencing system "Big Blue Button" is integrated into Moodle at the HTW.

What is the state of digitalisation of the construction industry in your country?

It was determined that this question cannot be answered in a general way, but must be considered in a differentiated manner for the areas of "crafts", "construction companies" and "planning offices".

In general, it can be said that as the size of the project increases, the scope of digital methods used also increases. This is expressed, for example, through the use of shared digital project environments (such as thinkproject.com), which have been the new standard in large projects for years. The exchange of documents such as correspondence, drawings, service specifications or protocols then takes place via these platforms.

PLANNING OFFICES

Planning offices use digital methods primarily for the creation of drawings and service specifications. The last also in connection with the invoicing of services. The use of building models has increased steadily in recent years in order to increase productivity in the company and to position itself in line with the market. However, there is often no exchange between the project participants because the client/builder does not provide for this contractually. While large planning companies now use BIM methods across the board, there is no uniform picture among the smaller offices. It can also be seen that the architectural firms and the specialist planners of TGA are more likely to use BIM methods than the structural planners.

CONSTRUCTION COMPANIES

Among the construction companies, it can also be seen that the degree of digitalisation increases with the size of the company. This is, among other things, due to the financial scope of the companies to specifically assign individual persons or departments to the digitisation of business processes.

In smaller and medium-sized companies, this step depends largely on the commitment of the company owners, who usually cooperate and take care of the implementation of new methods and tools themselves.

In the companies, quotation processing/calculation is often the first to be converted to the BIM methodology, as good software products are available on the market for this purpose. If the building models are not provided by the client, the companies sometimes have models created by third parties for their own account or have the capacities for this themselves.

Applications that go beyond this, such as surveying with a laser scanner or by drone, are still the exception.

DIGITAL COMPETENCES OF THE TEACHING STAFF

Since the digitalisation of teaching and administration has been promoted at the HTW for several years now, teaching staff have extensive opportunities for further internal training. This process has accelerated significantly due to the corona crisis and the resulting restrictions on attendance.

Teaching can now take place completely digitally. Teaching staff are supported in this by the Teaching Service Centre.

The following link provides information on the range of services:

<https://www.htw-berlin.de/einrichtungen/zentrale-referate/lehrenden-service-center/digitales-lehren-undlernen/>



Belgium ranks eighth in the Digital Economy and Society Index (DESI) in the EU this year. This is the index that indicates how fast digitalisation is progressing in the economy and society in each EU country. According to the European Commission, Belgium needs to convince more people to use mobile broadband and attract more young people to careers in digital technology

DIGITALISATION STRATEGY

As in Germany, the pandemic has led to the conceptualisation of a digitisation strategy in the German-speaking Community of Belgium. Approaches already existed before, but they have been strongly pushed since March 2020.

BUSINESS (ESPECIALLY CONSTRUCTION)

The companies are sensitised to digitalisation through further training offers and information. The COVID-19 situation has increased awareness even more. The government of the German-speaking Community is responsible for this.

There is also an initiative by the DG Government to provide the German-speaking Community with fibre-optic cables throughout the country in order to improve internet connections for businesses and households.

The education administration supports the purchase of hardware and software, partially covers the costs of in-service training for teachers.

The state of digitisation in the construction industry

The state of digitisation in the construction industry varies greatly - and mostly depends on the size of the company and the age of the decision-makers in the company. Young people with digital experience implement digitalisation more often and faster than people who, based on their previous experience, can be classified as rather digitally distant.

"Digitisation plan" using the example of ZAWM e.V.

ZAWM e.V. created its own digitisation plan

This includes:



Programmes used are:

- Pytha
- CadWork
- Inventor
- Solidworks
- Woodwop (CNC processing programme)
- Digital presentation programmes
- Digital company catalogues and learning platforms
- Word & Excel
- Teams

Digital learning tools are:

- PC
- Laptops
- Tablets as class sets as well as digital measuring devices

In addition, learners were provided with laptops and tablets (first year of apprenticeship). Previously, learners who were not IT-equipped at all received a laptop.

DIGITAL COMPETENCES OF THE TEACHING STAFF

The school itself provides further training for apprentices and also organises master classes and further training courses offered in cooperation with modern companies. Products from various companies are used.

In the area of CNC, CAD - the teaching staff mostly come from companies and thus bring the company experience and applications into their teaching.

GOOD PRACTICES

For the integration of digitalisation in VET programmes: digital joinery, BIM, (in timber construction), extension of the number of hours in CAD lessons, according to FIT for BIM

Participation in various EU projects dealing with digitalisation (e.g. integration of digitalisation in teaching and in the management of VET schools)

<http://classlab-ange.eu>

Instruments/learning tools suitable for adaptation by ZAWM e.V. include:

Adapted methods for digital distance learning in the different training levels - ready-made modules (sensitisation, mediation, simulation, exercises, information, knowledge check) e.g. digital measurement of a room, or an object (window, door) or "How to keep a construction site diary - reporting (photo documentation) - or Excel training for the construction industry



EDUCATION ADMINISTRATION

The flexibility of the Polish VET system allows learners in the regular training process to acquire additional competences or qualifications that increase their chances on the labour market, and adults to retrain quickly or acquire new qualifications that meet new economic, technical or social needs.

The VET reform introduced on 1 September 2019 has opened up new opportunities to continuously adapt VET provision to the needs of the labour market.

At ministerial level, the training offers the opportunity to select different computer programmes used in the construction industry, e.g. for modelling, planning and cost calculation.

A VET public school can, among other things: provide learners with additional vocational competences according to current labour market needs functioning in the Integrated Qualifications System. It should be emphasised that a catalogue of additional professional competences as well as qualifications, remain open.

Currently, the improvement of the adaptation of skills and qualifications to the changed framework conditions aims at the following aspects, among others:

- Identify the need to expand the supply of additional qualifications Vocational and market qualifications related to green and digital transformation,
- Strengthening the autonomy of the school by expanding the list of additional professional competences for the acquisition of qualifications relevant to the labour market,
- Preparing learners to carry out their professional activities in an environmentally friendly way / in harmony with nature
- Development of an awareness for rational shaping of one's environment
- Development of digital competence with attention to conscious use of digital technologies in individual professions

MANAGEMENT STAFF/TEACHING STAFF

The decision on the possibility of extending the teaching content is made in each case by the school management.

When selecting tasks, teaching staff pay particular attention to the needs of the developing labour market and the interests of young people.

It tries to make the selected material appealing and easy to understand. However, the degree of innovation of the methods used varies, often including average.

At the same time, the Central Examination Board, which is itself responsible for professional examinations, does not currently apply any computer programmes or digital tools used in the construction industry.

There is a great need for innovative subject-related digital teaching materials for VET institutions and for further training opportunities for teaching and training staff.*

file:///C:/Users/User/Downloads/20220920_Plan_dzia%C5%82a%C5%84_w_zakresie_kszta%C5%82cenia_i_szkolenia_zawodowego_na_lata_2022-2025.pdf

LEARNING

Skills in the use of digital programmes that apprentices acquire during vocational training are usually used at a higher level, i.e. subsequently in the companies at the workplace connection or in the case of taking up studies at the universities. Lessons conducted with digital programmes are much more attractive and appealing to the learners and are very much welcomed by them. Learners are aware of the opportunity to use the skills they have acquired at school. Learning different programmes does not require any additional motivation among the target group.

*(Poln. Bildungsministerium - Ministerstwo Edukacji i Nauki Plan działań w zakresie kształcenia i szkolenia zawodowego na lata 2022-2025; Aktionsplan Bildung und Berufsbildung für die Jahre 2022-2025 Warschau September 2022)

CONSTRUCTION FRAMEWORK

There is great momentum when it comes to the increase in the number of digital solutions available and the scale of their implementation. A few years ago, only the largest construction groups could afford this, mainly due to high software prices, implementation costs and the lack of supporting experts. However, many companies can now afford to use digital tools. This is due to the increased awareness of the benefits that digitalisation brings. Polish construction companies need to advance digitalisation faster compared to other countries (e.g. Denmark).

The obstacles are mainly mental. Digitalisation means changing ways of working that have been rooted in the industry for years.

For new companies with young teams, the introduction of digital technologies for construction is a given. But not everyone finds it easy to open up to change and understand new tools.

At this point, it should be emphasised that there is currently a good trend in the market and that public clients are increasingly making digital tools mandatory in the implementation of public sector projects.

3. HOW TO DEVELOP A GOOD STRATEGY?

Before you start working on a strategy, you should ask yourself what you understand by the term and whether this interpretation is also shared by the other stakeholders.

Experience shows that misunderstandings can arise in the conceptualisation of strategies, as it is not uncommon for implementation measures to be wrongly declared as strategies.

However, the development of strategies involves the identification of objectives.

The associated measures then belong to the category of capacity building.

The focus of the project is on the digitisation strategy for the VET institutions.

When developing goals, the following fundamental questions must be considered:

- *How do you want your institution/company to look and function in the future?*
- *Why do you wish to modernise or further develop your institution/company?*

The starting point for successful capacity building is the analysis of one's own potential, whereby the following aspects should be mentioned:

- *What are the strengths of your company/institution/school/ or university?*
 - *What educational offers do you currently provide?*
 - *What is missing?*
 - *How do you differ from others?*
 - *With whom and with which partners can you cooperate?*
 - *Do you have a good connection to the promoters, decision-makers?*
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4. CAPACITY BUILDING

MEASUREMENT OF THE STATE OF DIGITISATION

IN VOCATIONAL TRAINING INSTITUTIONS

In order to measure the state of digitalisation in VET institutions, we recommend the management and teachers as well as learners to USE the Selfie tool.

Before starting SELFIE surveys, it is important to explain to the participants what SELFIE is, why it should be done and what is the added value (the benefit for the participants themselves). The questions have to be formulated carefully and the questions must be tailored to the target groups.

Unfortunately, most educational institutions are not aware of the tool. Alternatively, an exchange between vocational schools (also internationally) can be offered as support.

TECHNICAL RESOURCES

ORGANISATION OF ONLINE LEARNING

Most VET institutions use Moodle mostly only for financial reasons (decision of the school administration in most EU countries). Some ministries provide it free of charge to schools (e.g. in Belgium). In many countries there are still no decisions on the integration of online systems in VET systems.

In the meantime, various learning platforms are in operation that are made available by the local education administration. Teachers can try out several tools and choose the ones they are most comfortable with. In Berlin, for example, there is the Berlin Learning Platform. However, the lack of coordination currently leads to another problem: teachers at a vocational school then use different tools and learners have to familiarize themselves with how these different programs work.

WORKING WITH TABLETS / MOODLE IN ONLINE TEACHING

A tablet can be used to present the content as if it were on a whiteboard. However, it is important to note that the learning content should be presented evenly and divided into smaller sequences to maintain a certain level of attention.

As a parallel asynchronous format for online learning, learning platforms such as Moodle are best suited. Here, trainees can work on the learning content not only in smaller units.

When conducting tests to check learning progress, it makes a lot of sense to include playful components that motivate people to continue working. This does not mean that "dry asynchronous formats" are not suitable for teaching subject-related knowledge.

However, detailed, complex content, such as extensive formulas, cannot be implemented directly on the learning platforms. However, a diversion via graphic exports with *copy & paste* is always possible.

One should also be aware that such a course-accompanying learning system, including learning progress checks, is extremely time-consuming and that the associated concepts / learning units must already be available in advance.

ENSURING ACCESS TO DIGITAL TOOLS

For lectures or general teaching seminars, video formats in particular can be used, e.g. via BigBlueButton or other tools. In this case, it is possible to conduct online lessons via Zoom or Skype. The contents of the lesson on the whiteboard or blackboard can also be conveyed via this. Old slide sets can be subsequently set to music and then uploaded to the video platforms. Depending on how much effort one can afford, these three formats can be implemented relatively quickly. It is up to each teacher to decide which content is to be prepared by Moodle as learning content.

SUPPORT FOR SCHOOLS

Another option is to use external trainers (for the technology aspects). If schools have an active IT administrator who provides technical support for the software, digital programmes/tools will be more effective and will not need to be designed by the schools themselves. Therefore, every educational institution would need to have a digital officer, acquired from within the college (compensation for teaching hours to be provided) or an external expert.

Young people are often said to be able to use digital content intuitively, but this does not always correspond to reality: When learning with online systems, they also need detailed guidance. It also shows that online formats are not always a holistic solution: In the wake of the pandemic and the lockdown, it became clear that adolescents managed lessons better with the support of classmates and teachers.

EQUIPMENT

80-90% of trainees own (or have access to) a PC or laptop at home. Approximately 50% use their cell phone as a digital platform - but the small screen is rather unsuitable for learning as they cannot read the material well with it - and the ever-adapted materials are usually not available via smartphone.

Steps for implementation of digitisation

With regard to concrete integration into the lesson plans of a VET institution

1. Analysis of the existing framework curricula in building professions:
Scope, obligatory contents, topicality of contents, legal framework conditions
2. Analysis of existing frameworks of other related professions incl. teaching of technical language
3. Check the parallelism of content in a thematic area
4. Which professions are affected, where are there overlaps etc.?
5. Elaboration of options for deletion in one subject or in selected content-related subjects (repetitions) in favour of the teaching of new digital competences
6. Check of legal plausibility
7. Consultation in the teacher/education circle
8. Collection of ideas for implementation
9. Check of human, financial and technical resources
10. Consultation with learners using e.g. the selfie tool (needs, wishes, assessment of the current situation, perception of the school's digital offers etc.)
11. Ideas for the designation of competences in the final certificate
Consultation with decision-makers
12. Consultation with decision-makers
13. Update the proposals and adopt implementation in the regular curriculum of a VET institution.

With regard to securing the target group

LEVEL OF ARCHITECTS AND PLANNERS

In order to successfully shape the construction turnaround, targeted further training offers and cooperation between all responsible actors are required. In this context, it is of great importance to identify possible problems in the implementation in everyday professional life in advance and at the same time to maintain the exchange with politics and administration about this..

POLITICAL LEVEL

Key elements for digital and sustainable planning and building are:

Uniform framework conditions - e.g. the building regulations and funding programmes Sustainability in building should not be a special feature, but the normal case.

"For an agile and resilient education system, teacher training at the highest level is elementary. This applies in particular to the highly dynamic field of digitization. Digital teaching and the use of digital methods in the classroom are neither an end in themselves nor an additional task."

(BMBF, 29.11.2022)

5. THE CONSTRUCTION INDUSTRY

For construction companies, the digitalisation of the construction site is particularly important.

The potential lies primarily in better networked process flows. Here, it is important to combine different processes around construction, i.e. the compatibility of many steps.

The realisation of this project holds great potential for the construction sector, as it can make the everyday work of construction professionals more effective and economical, especially through the application of the BIM method, in which paper documentation, for example, is replaced by digital construction files.

"Building Information Modelling" (BIM), a method for the digital planning, execution and management of structures, is establishing itself as a standard throughout the EU.

Within the framework of a Strategic Partnership FIT for BIM, BGZ has tested and developed learning models for vocational and higher education to integrate the topic of digital construction into vocational training together with partners from Belgium, Denmark and Poland. www.bim-fit.eu

The basic BIM idea is now already being practised, but to a very different extent depending on the EU country or region.

The Digitisation Index for SMEs from 2020/2021 shows that the average level of digitisation of SMEs in the construction industry in terms of digital business models is only 45 points out of 100.



6. CONCLUSION FROM THE PROJECT WORK

Digital programmes as well as digital, technical devices are nowadays indispensable in the modern teaching of digital skills, in vocational schools, universities and companies.

- The digital building turnaround, the restructuring of our cities/villages is a task for society as a whole that affects all areas of life. It must necessarily be shaped in joint responsibility and in an interdisciplinary manner.
- It should be borne in mind that many recommendations come from the philosophy of science: "*Scientists are researching.... Scientists, however, are not educators and consider digitalisation to be the non-plus-ultra in all areas, unfortunately sometimes without a view that not only subject knowledge is taught in school*".
- A very closely practised cooperation between universities and VET, as has been the case with "DiGiCon" and previously with the "Fit4BIM" project, counteracts the problem and provides valuable synergy effects for both sides.

The learning conditions are good if the target group of trainers, teachers of vocational schools and trainees and SMEs bring in different resources.

For the University of Applied Sciences in Berlin:

"It was particularly interesting to see the depth of vocational training and the methods used".

Furthermore, for the HTW:

"The orientation of learning content to higher-level processes, which in turn are embedded in the life cycle of real estate, was new for the HTW- (...) as it is not implemented at other Berlin universities either".

(Prof. Dr.-Ing. Jens H. Liebchen / HTW, Research area Construction Management | Department II?

It is important to realise that digitisation involves high investments and that its implementation takes time.

TEACHERS AT THE VOCATIONAL SCHOOLS

Digital programmes and devices cannot replace a teacher and personal communication. This must be taken into account in the development of digital strategies. Teachers & trainers need to be professionally introduced and integrated into the redesign process, which was clearly demonstrated at DiGiCon and led to the development of an exemplary procedure for integrating new digital learning units into school curricula, which has already been adapted in Poland.

Currently, there is a lack of systematic support for teacher training, as well as of equipment with e-learning resources (personnel, technology, finances).

Every vocational school needs a good internet connection, a cloud (Moodle, Yammer or similar) where learning materials are available, as well as good equipment with hardware and software for both training staff and learners.

MANAGEMENT STAFF

It is advisable to be able to answer the question of whether you as the person in charge (manager/director/CEO, etc.) really know the needs/problems of your target groups.

(Leader/director/managing director, etc.) really know the needs/problems of his target groups?

(Learners/teachers/trainers/construction companies, decision-makers in the relevant authorities, administrations).

It is often assumed that all teachers are completely autonomous and enthusiastic about implementing innovative ideas in their daily professional practice and that trainees show great interest in subject-related programmes. This is a misconception.

LEARNING

Today's trainees are usually familiar with the common digital means of communication and use online communication in private. The problem is that this is usually limited to hip games or the consumption of videos on YouTube, etc.

There is also a risk that particularly weaker apprentices will be left behind - due to lower motivation, which can be attributed to the lack of digital technology (up to 10% of apprentices do not have access to a computer, a camera and/or a suitable internet connection, depending on the country). This is obviously determined by the location of the place of residence in addition to the family situation. The problem is defined as "digital poverty"¹.

¹ <https://jugendhilfeportal.de/artikel/auch-digitale-armut-ist-realitaet-expertin-fuer-schulsozialarbeit-fordert-die-schwaechsten-im-blick-zu-behalten>

In the economically weak regions, companies/schools then often lack not only the opportunities to support the disadvantaged, but also teachers who are looking for jobs in more attractive regions. The phenomenon seems to be a pan-European one.

In addition, up to 30% -40% of learners have problems organising their online learning themselves.

Computer science and PC skills should therefore not be deselected in general education schools and the teaching of digital skills should be more related to realities of life or later careers (e.g. data security, calculations, filling out digital forms, critical use of internet sources, promoting understanding of graphic plans, etc.).

Otherwise, the insufficient knowledge will become a problem in the subsequent training and studies.

The promotion of human and technical resources of educational institutions is urgently needed, both to promote the acquisition of digital skills and to promote digital participation.

TEACHERS

Teachers are aware that online learning, digital tools are no longer music of the future.

Therefore, they need to be involved in the development and integration of digital media at VET institutions - geared to their needs.

At the same time, it is clear that many are still unable to follow all the requirements themselves. Today, it still depends on the competences of the individual.

The many different seminars that are currently offered and are also relatively expensive will not solve the structural problem of a lack of comparable quality standards and comparability of competences in the long run.

It is also not true that the next generation of teachers and trainers has sufficient methodological and didactic knowledge to teach digital skills, and if they do, it is not sufficiently subject-related.

CONSTRUCTION INDUSTRY

According to the survey conducted by PwC with 100 companies from the planning & design, construction and plant engineering sectors (2019), 52 percent of construction companies in Germany, for example, already have experience with digital construction, specifically with Building Information Modelling (BIM)*.

Since 2020, the use of Building Information Modelling (BIM) has been mandatory for all new public infrastructure projects. The new competence requirements (digital modelling, data management, etc.) no longer only affect the construction management (architect/engineer/polier), but increasingly also the skilled worker level.

All those involved in the process must have these skills - regardless of their qualifications - so that work processes function smoothly. In order to successfully shape the construction turnaround, targeted further training and cooperation of all responsible actors is required.

CONSTRUCTION FIRMS

The players in the construction industry are aware of the importance of digitalisation. Nevertheless, the degree of digitalisation in the individual companies still leaves a lot to be desired.

Here, attention must be paid above all to adapting familiar project processes so that the scepticism that sometimes exists can be eliminated for the implementation of changes.

A certain operating routine often does not allow one to see what needs to be changed.

As a rule, contractors already have enough to do with their day-to-day business.

There is little time for strategy.

What is needed above all is internal communication before good modernisation concepts, strategies, etc. can be adopted.

The staff must recognise the benefits for their daily professional practice, e.g. in the thematic field of circular construction. The building professionals must not fear any personal disadvantages so that the willingness to change incl. further training etc. is accepted.

The importance of the topic is all the more important because more and more digital solutions are being offered. However, many of them are individual solutions and do not show how they can be transferred to the concrete framework conditions of a construction company (range of customers, concrete needs depending on the trade, etc., personnel capacities, etc.).

CHAMBERS / GUILDS

At this point, the chambers and guilds are in particular demand as the actors who have a direct line to the companies.

The seminars and surveys conducted in the project showed that many also have too little legal and political knowledge, e.g. about funding opportunities. To ensure the success of digitalisation, entrepreneurs must be aware of the (legal and political) framework conditions. In addition, the exchange with female architects must be intensified, as they contribute to the change towards digital and sustainable building.

To this end, they would like the chambers of architects to include new fields of activity in the design of their offers.

Cooperation already practised between e.g. chambers of industry and chambers of crafts can provide good synergy effects (example: a well-maintained cooperation between the IHK zu Berlin and the HWK), as was the case, for example, with the campaigns to attract skilled

workers.

In general, strengthening the joint use of existing concepts, seminars is recommended and should be examined (digital cost calculation, processing of orders, etc.).

In the digitisation process, the role of inter-company training should not be underestimated. Their role here is also training with an orientation towards real digitalised and practical tasks on the construction site.

We are also pleased to point out the results of the Institute for Work and Qualification (IAQ) of the University of Duisburg-Essen (UDE), which surveyed 40 chamber representatives on their commitment to and experience with in-company training. The results can be found free of charge in the current IAQ report.

Key findings are:

- The digital report portfolio plays the role of a "door opener" in the digitisation process of training as an administrative tool. Many companies have introduced it, many chambers have supported this process.
- In the chambers of commerce and industry, the topic of digitalisation has already become more widespread, while the chambers of crafts and trades are still taking a more selective approach.
- Chambers in industrial conurbations are more involved with digitisation than chambers in large, rather structurally weak chamber districts because they are more driven to do so by their member companies.
- Digital learning opportunities often lead a "lighthouse existence". Blended learning and interactive whiteboards are common tools in classrooms. The potential of other forms of learning is practically not used.
- The acceptance of digital training offers differs regionally, depends on the sector, the age of the participants and their learning socialisation, but also on the "chamber affinity" of the individual companies".

POLITICAL LEVEL

In our opinion, key elements for digital and sustainable planning and building are above all:

- Comparable to uniform framework conditions - e.g. the building regulations and funding programmes Digital and sustainability in construction should not be a special feature or a dream of the future, but the norm, especially as the construction business is very international.

- The necessary acquisition of adequate skills by teaching and training staff requires a well thought-out, national reform of teacher training programmes and targeted, practice-based further training for both training staff and teachers.
- For this, the "construction site administration" must be digitalised in advance.
- The administrative staff usually have the same need for further training as the (construction) companies.

Above all, the contracting offices and authorities must be staffed with sufficient personnel. It must be clear to the responsible authorities that digital processes lead to major cost savings as well as significant time savings by improving site organisation and communication, which translates into lower project costs.

It is important to create clarity that any technological investment will show measurable gains after full implementation of the solution and consistent use.

Respecting the specifics of the legislative process is not easy per country. The problem is e.g. defining the scope of the use of such tools.

Also, the Directive adopted by the European Parliament and the European Council, which regulates the area of public procurement, does not provide concrete solutions that could be used by contractors and contracting authorities.

However, this does not mean that Member States' hands are tied in this respect and companies operating on their territory cannot use such tools today. One example is "PlanRadar software", which thanks to its functionality can be an alternative to e.g. an electronic construction diary and is additionally integrated into BIM technology.

It should be emphasised that the mandatory use of digital tools in public tenders should become the rule, as it is in everyone's interest that public investments are implemented faster and cheaper.

THE DIGITALISATION STRATEGY OF THE CONSTRUCTION SECTOR

In our experience, the German Confederation of Skilled Crafts (ZDB) has put it in a nutshell how the digitisation of the construction sector can be successfully implemented and names the necessary steps as well as the framework conditions that must be in place for this.

This opinion is also shared by our project partners.

<https://www.zdb.de/positionen/digitalisierung>



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