CoConstruct

CoConstruct – Digital learning meets sustainability

LTTA Poznan, Poland

25.06.2023 -29.06.2023

Co-funded by the Erasmus+ Programme of the European Union

BGZ Berliner Gesellschaft für internationale Zusammenarbeit mbH

Publisher & Project Coordinator

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1. THE PROJECT

The digitisation is altering the demands on vocational education in Europe. The aim of CoConstruct was to showcase perspectives for the successful integration of digitisation and innovative technologies in vocational education, exemplified in the construction sector.

BGZ brought together vocational training centres and universities from 5 countries through CoConstruct: Germany, Bulgaria, Finland, Romania, and Poland. The project primarily focused on the transfer of innovation.

We consolidated good practices to promote digital job-related competencies, assessed their usability across the EU, and explored possibilities for their institutional integration. Throughout this process, we closely collaborated with associated partners from business associations, chambers of commerce, authorities, and construction companies.

Our objective was to disseminate proven content, methods, materials, and tools, foster closer collaborations between vocational and higher education, and enable educators to enhance their competencies through the project. Through the transfer of European good practices, we aimed to enhance educational offerings in the construction industry and make the profession, especially for technically inclined young individuals, more appealing.

Furthermore, as a result of CoConstruct, we anticipate concrete recommendations for modernising vocational education systems and a contribution to securing a skilled workforce.

More information:

www.coconstruct.eu

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2. BACKGROUND & GOALS

In our project partnership, we focused on construction and building professions, along with digitisation, while also considering environmental and sustainability aspects. The partners brought together good practices and new approaches to shaping vocational education with a focus on digitisation and technological innovations from five EU countries, evaluating their usability for EU-wide transfer and institutional integration.

The primary emphasis was on the use of digital devices on construction sites, as well as aspects of sustainable construction industry. The learning activities described here benefited from the synergies of the other two BGZ projects: the DigiCon project and the implementation of a flow within the mobility measure Skills 4.0 Mobil (topics in the field of digitisation). The insights and results from these projects strengthened the implementation of this learning activity.

The exchange within the project so far facilitated the sharing of concepts and materials, enhancing the execution of further EU projects within the partnership. This signifies a significant enhancement of competencies for them, which will aid them in the future to provide more engaging and appealing training and development materials, as well as modernizing their institutions.

The aim of this LTTA was to strengthen the skills of teaching staff in designing learning environments, handling innovative models and tools, fostering collaboration between vocational and higher education, and understanding the method of BIM (Building Information Modelling).

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3. PREPERATION

In preparation for the LTTA, the sequence and specific content were collectively coordinated with the entire project partnership. Partners PUT and ZSB1 developed a detailed program for the learning activity and presented it for discussion among the partners. The program was reviewed within local working groups and subsequently discussed again with all partners, with revisions carried out by PUT and ZSB1. Additionally, the necessary technical tools were precisely defined.

PARTICIPANTS

The participants of the LTTA are members of various networks at local, national, and European levels. This allowed them to serve as disseminators of information about the CoConstruct project and contributed to generating interest from other institutions. CoConstruct enabled the partners to expand their networks not only within EU countries (covering a broad geographical spectrum of the EU partnership: North, South, West, and East of the EU) but also to shape new collaborative initiatives with fresh ideas for cooperation. This enabled them to incorporate insights from the partnership's good practices into their concrete educational practices, integrating innovative pedagogical methods and digital tools.

Participating in the activity were representatives from:

- BGZ, coordinator
- Vocational High School for Construction, Architecture, and Geodesy "Angel Popov" (PGSAG), Bulgaria
- Construction Industry Association Berlin-Brandenburg e.V. (BFW-BB), Germany
- Technical Vocational School for Construction (Zespol Szkol Budownictwa Nr 1 Posen, ZSB1), Poland
- Poznań University of Technology (Politechnika Poznańska, PUT), Poland
- Project partner JEDU (Educational Federation in Finland)
- MancomCentru (Mancom), Romania

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4. IMPLEMENTATION

The LTTA was organized jointly by the project partners PUT and ZSB1. As one of the leading technical universities in Poland, PUT possesses excellent expertise in innovative models and tools in the field of new technologies and has extensive experience in professional development. As a vocational school specializing in construction technology and building construction, ZSB1 has years of expertise in practical training and in fostering collaboration between vocational and higher education.

PROGRAMME

In terms of content, the main focuses of the LTTA were particularly on the following points:

- Introduction to the learning activity and presentation of ZSB1 & PUT along with their good practices.
- Lab tours at PUT and discussions with professors from PUT regarding international learning site cooperation between vocational education and training (VET) and higher education (HE).
- Workshop: Requirements and concepts for the advancement of education - digital transformation (BIM) & further education offerings in the digital era (construction professions, architectural professions, technical professions).
- Workshop on the topic of digital and hybrid education and training (methods, framework conditions, etc.).
- Capacity building at the institutional level.

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Project	CoConstruct - LTTA Learning Teaching Training Activities
Location	Poznań, Poland
Date	25.06.2023 - 29.06.2023

Programme

Sunday, 25.06.2023		
15:00 - 18.00	Arrival at the Hotel	Hotel IBIS Poznań Stare Miasto ul. Kazimierza Wielkiego 23 61-863 Poznań / +48 61 8584400 https://all.accor.com/hotel/3110/index.de.shtm
18:30	Welcoming	Hotel IBIS Poznań Stare Miasto ul. Kazimierza Wielkiego 23 61-863 Poznań / +48 61 8584400 https://all.accor.com/hotel/3110/index.de.shtm
Workshop Location	PUT ul. Piotrowo 5	https://www.put.poznan.pl/en https://www.put.poznan.pl/eunice
Workshop Location	ZSB Nr 1 - ul. Rybaki 17 61-883 Poznań	https://zsb1.poznan.pl https://zsb1.poznan.pl/dyrekcja
Monday, 26.06.2023, Location: ZSB Nr 1, ul. Rybaki 17		
9:30	Registration for seminar "Sustainable Construction" („Budownictwo zrównoważone“)	Ul. Rybaki 17
10:00 - 12:00	Seminar part 1	All partners & companies
12:00 - 12:30	Coffee break	
12:30 - 14:00	Seminar part 2	All partners & companies
14:00	Lunch	
14:00 - 15:30	Seminar part 3	All partners & companies
20:00	Joint Dinner or individual time	

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Tuesday, 27.06.2023, Location: PUT ul. Piotrowo 5		
09:15	Meeting at Hotel Reception	
09:30 - 9:45	Welcoming at Poznan University of Technology (PUT) Katarzyna Rzeszut D.Sc. Eng. PUT WP2 Leader, Director of the Institute of Building Engineering Grażyna Wittgen, M.A. , Project Manager at BGZ	PUT ul. Piotrowo 5 61-138 Poznań Building A2 (pink) Ground floor, Room 139
9:45 - 10:00	Introduction of activities of Poznan University Focus: Institute of Building Engineering	Katarzyna Rzeszut D.Sc. Eng.
10:00 - 10:20	Digital construction applications and tools for vocational training - digital tools for teaching competences on the subject of the behaviour of RC beams	Iwona Jankowiak D.Sc. Eng.
10:20 - 11:00	E-Learning - Aspects of Dalton Education	Monika Siewczyńska D.Sc. Eng.
11:00 - 11:30	Coffee break	
11:30 - 12:30	Workshop Demands on and concepts for the further development of training - digital transformation	All partners
12:30 - 13:30	Lunch PUT- Campus Piotrowo	
13:30 - 15:00	Laboratory of Ageing (Laboratorium starości) PUT-Campus Piotrowo	
15:00	Free time – individual suggestions	
Suggestions for the afternoon	• Visit to Poznan Cathedral (Katedra Poznańska) at Cathedral Island (Ostrów Tumski) • Cultural and business centre "Old Brewery“ (Stary Browar) https://www.poznan.travel/de/r/warto-zobaczyc/top10-rzeczy-ktore-musisz-zrobic-w-poznaniu	Ostrów Tumski 17 61-120 Poznań (until 17:00) Stary Browar Ul. Półwiejska 42 61-888 Poznań
19.30	Joint Dinner	Hotel IBIS Poznań

Wednesday, 28.06.2023, Location: ZSB Nr 1, Rybaki 17		
9:30 - 13.00	Workshops • Cooperation with political decision-makers (Concept ManCOM) • Concepts for the further development of VETorganisations	All partners
13:00 - 14:00	Lunch - individual	
14:00 - 15:00	Workshops All partners Digital and hybrid training and further education (methods, framework conditions, etc.)	
15:00	Free time	
19:3	Joint Dinner / individual time	
Thursday, 29.06.2023, Location: ZSB Nr 1, Rybaki 17		
9:30 - 11:00	Exchange of experience & consultation with experts and decision-makers Topics: • Securing skilled workers in the building trade • Cooperation - vocational training - universities - companies • Transfer options of GPs • Prospects for EU-wide cooperation	
11.00 - 12:00	Evaluation	

Sunday, 25.06.2023

Upon the participants' arrival at the hotel in Poznan (Poland), Grazyna Wittgen, Project Manager of BGZ, inaugurated the LTTA. Her opening remarks were followed by discussions on organizational aspects of the LTTA and an explanation of the schedule. Subsequently, the teams were introduced, and participants had the opportunity to become acquainted.

Monday, 26.06.2023

The first substantive day of the LTTA commenced with a specialized conference from the construction sector, hosted by the receiving institution ZBS1 at their premises. Representatives from education, academia, and industry delivered presentations during the event.

Image 1-4: ZSB1

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The participants of the LTTA gained valuable insights into the current state of the construction sector. This understanding was provided from multiple angles: scientific (with a focus on construction in relation to the latest climate change data), pedagogical (emphasizing modern teaching methods for the construction sector), and economic (introduction of cutting-edge materials and techniques by renowned construction companies).

Conclusion: The impacts of climate change are more significant and are occurring earlier and more intensely than anticipated. It presents the construction industry with a series of challenges as it affects various aspects of the construction process, materials, planning, and long-term sustainability.

Maintenance and Resilience: Climate change is resulting in more extreme weather conditions, such as heavier rainfall, heatwaves, storms, and floods. Buildings need to be more resilient. This necessitates the use of sturdier construction materials and methods, as well as the consideration of revised building codes to adapt to the changing conditions.

Material Availability and Quality: Climate change can impact the availability and quality of construction materials. For instance, changes in raw material sources like wood, concrete, or metals could occur due to the changing climate conditions.

Energy Efficiency and Building Performance: Rising temperatures necessitate increased cooling of buildings, which raises energy consumption. The construction industry must place a greater emphasis on energy-efficient designs, insulation, heating, and cooling systems to make building operations more sustainable.

Urban Planning and Infrastructure: Urban planning needs to adapt to changing climate conditions to minimize risks to the population. This includes measures such as flood prevention, the creation of green infrastructure to reduce heat islands, and the promotion of sustainable transportation options.

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Regulations and Codes: Governments, including the EU, are increasingly implementing stricter environmental and building regulations to address climate change. The construction industry needs to adapt to altered standards and might have to develop innovative methods and materials to meet these requirements.

Costs and Financing: Adapting to climate change and implementing sustainable construction practices can initially lead to higher expenses. The construction industry needs to find ways to manage these additional costs while simultaneously achieving long-term financial benefits through reduced operational expenses.

Skill Shortage and Training: The changes in the construction industry demand new skills and knowledge from the workforce. Educational institutions need to adjust training and further education programs to ensure that professionals possess the necessary skills to meet the requirements of sustainable construction practices.

Addressing these challenges necessitates close collaboration among architects, engineers, construction companies, educational providers, governments, and other relevant stakeholders to devise innovative solutions that align with the demands of the changing climate. The construction industry must confront the challenge of designing cities and buildings in a way that makes them livable during phases of both extreme drought and heat, as well as heavy rainfall, floods, and cold weather.

In this process, factors such as energy and cost efficiency, resource conservation, CO2 neutrality, and sustainability must be considered right from the outset, starting from the selection of construction materials and extending all the way to their recycling.

In this regard, the contributions from the present construction companies and building material manufacturers were highly informative and provided valuable insights into state-of-the-art best practice solutions.

Representatives from the education sector provided valuable input on modern learning methods and (digital) learning tools for use in the construction sector.

Image 5-6: ZSB1

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Tuesday, 27.06.2023

Later in the LTTA program, there was a visit to the Poznań University of Technology (Politechnika Poznańska, PUT). The participants were warmly welcomed there by Dr. Katarzyna Rzeszut, Director of the Institute of Civil Engineering.

Dr. Rzeszut introduced the participants to Poznań University of Technology, particularly highlighting the Institute of Civil Engineering.

The participants became acquainted with the various departments within the institute:

- Department of Building Technology and Materials
- Department of Construction Project Management and Engineering
- Department of Structural Engineering

Subsequently, various research laboratories within the institute were introduced and visited:

- Inter-Institute Laboratory for Structural Engineering
- Laboratory for Building Chemistry
- Laboratory for Construction Materials and Concrete Technology
- Laboratory for Aging Processes

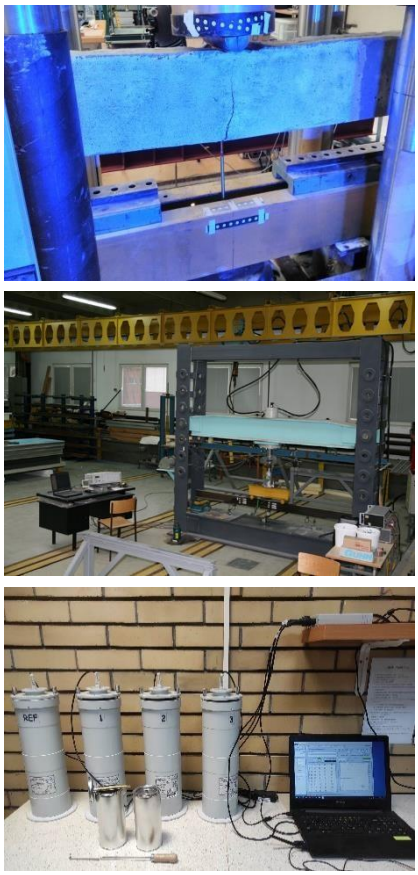

Image 7-9: PUT

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The research areas of the institute include, among others:

- Modern Materials and Large-Scale Construction
- Additives and Admixtures for Cement, Mortar, and Concrete
- 3D Building Design and BIM (Building Information Modeling)
- Flexibility and Agility in Construction, along with Multicriteria Analysis
- Modeling and Control of Risk Management in Manufacturing Processes
- Shape Memory Materials
- Concrete, Steel, Wood, Aluminum, Sandwich, and Composite Structures

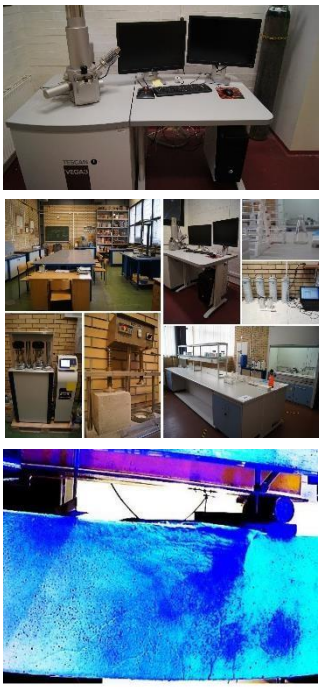

Image 10-15: PUT

The expertise of Poznan University of Technology in the field of civil engineering is clearly demonstrated through their numerous relevant academic publications, national and international collaborations (both in research and industry), and their participation in successful national and international projects and research consortia.

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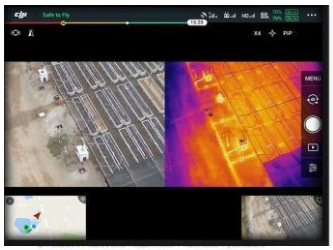
Image 16-19: PUT



The focus for the future development of the institute lies in the areas of:

- Digitization and Innovative Technologies in the Field of Civil Engineering
- Dissemination of New Methods, Materials, and Tools in the Construction Industry
- Enhancement of Research and Educational Opportunities in an International Context
- Strengthening Expert Activities for the Industry
- Participation in New National and International Funding Projects

This was followed by a presentation by Dr. Iwona Jankowiak from Poznan University of Technology on the topic of the need for and use of e-learning and digital tools in vocational and higher education in the field of civil engineering. A specific practical application of digital tools was demonstrated using the example of a reinforced concrete beam. The behavior of (micro) cracks in this commonly used construction element could be effectively represented through digital simulations.

Another highlight of the day for the LTTA participants was the tour of the institute's research laboratories, including hands-on experimentation with research subjects. Notably, the Laboratory for Ageing stood out. Using specialized equipment such as special goggles, vests, suits for arms and legs, etc., combined with aids like walking frames and wheelchairs, the physical (and consequently psychological) effects of ageing processes were simulated.

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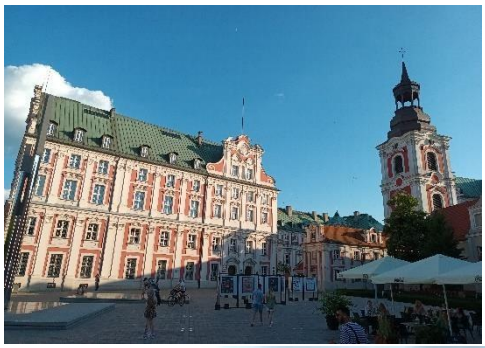
For example, the specialized goggles simulated various agerelated eye conditions and visual impairments (glaucoma, cataracts, etc.), while different elements of the specialized suits simulated physical discomfort due to aging (weights in the suit, restricted mobility, etc.).

Image 20: PUT

The connection to vocational and higher education in construction and architectural themes was established through the following task: as a simulated elderly person suffering from various agerelated ailments and possibly reliant on a wheelchair, participants were asked to find and use the accessible toilet on the ground floor in a multi-story building while starting from the third floor. This task proved to be quite challenging and frustrating for a healthy, younger individual due to encountering numerous obstacles and difficulties within the building. This experience highlighted that buildings are generally not adequately designed for people with disabilities. However, the simulation provided valuable insights for building design in areas such as elevator and stairwell design, markings and signage within the building, restroom design, etc.

The rest of the day included a tour of architectural highlights in the city of Poznan (Old Town, Cathedral, riverbank design, etc.).

Image 21-23: BGZ



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Wednesday, 28.06.2023 and Thursday, 29.06.2023

The LTTA took place in the premises of ZSB1 during these days and primarily involved participants collaborating through workshops.

The main thematic focuses were:

- Collaboration with Political Decision-Makers
- Capacity Building
- Concepts for the Advancement of Vocational Education Organizations
- Digital and Hybrid Training and Further Education Measures (Methods, Frameworks, etc.)
- Skill Shortage in the Construction Industry
- Collaboration - Vocational Education - Universities - Enterprises
- Transferability of Best Practices
- Prospects for EU-wide Collaboration

City tours, a visit to a local history and culture museum, as well as shared dinners at the end of each day, fostered mutual exchange among the participants and provided a fulfilling conclusion to the daily LTTA program.

The LTTA concluded with an evaluation of the accomplishments over the past few days. Following a final shared dinner, participants bid each other warm farewells, expressed hopes for future collaboration, and embarked on their journeys home.

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5. RESULTS

In particular, collaboration within the workshops highlighted the following needs and suggestions at the institutional level:

School Structure and Resources

Overall, the participants aspire, at an institutional level, to provide innovative and futureoriented learning environments that optimize not only the learners but also the entire teaching staff (VR/AR elements, whiteboards, large screens, video and online classes, as well as hybrid learning environments). This comprehensive approach aims to enrich the educational experience and prepare students for the demands of a modern vocational future.

To achieve these goals, financial resources are crucial. Institutions are planning to invest specifically in staff training to ensure that teachers can effectively utilize the new technologies. Additionally, there is a need for additional qualified staff to support the introduction and maintenance of the technologies and to adequately support the learners.

Curricula, Courses, Programs

There is a need for intensified process digitization and the integration of Building Information Modeling (BIM) to enhance efficiency and accuracy in the construction industry. Concurrently, curricula should be closely aligned with industry requirements to ensure that education remains practically relevant and adequately prepares graduates for the workforce.

To respond more swiftly to global challenges, an increased international exchange is of paramount importance. This provides access to diverse perspectives and proven practices from different countries that can contribute to the development of innovative solutions.

Continuous professional development for teachers is essential to keep pace with the latest developments in the construction sector. A dedicated platform for teachers can foster knowledge exchange and provide opportunities for teachers to expand their skills.

The provision of comprehensive development opportunities enables teachers to strengthen their competencies and experiment with innovative teaching methods. It is important to grant them flexibility and autonomy in designing instructional projects to meet individual needs and create a dynamic learning environment.

An intensified interdisciplinary approach in teaching promotes holistic education for students and allows them to develop interconnected thinking. This can be supported through the introduction of more workshops and the integration of current digital teaching materials.

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Additionally, incentives should be created to motivate teachers to actively participate in projects. These projects not only offer practical experiences but also foster continuous teacher development, which positively impacts the quality of education.

Employee Competencies

There is a need for increased allocation of time resources for teaching staff to enable comprehensive professional development opportunities. Digital competencies are crucial in today's educational landscape. Therefore, it is essential to offer targeted training that empowers teachers to effectively integrate modern technologies into their teaching.

The provision of targeted training programs plays a pivotal role in ensuring that teachers possess the necessary skills and knowledge to meet the demands of a changing educational environment. Through the exchange of best practices, teachers can learn from each other and incorporate proven methods into their teaching.

Access to a wide range of resources is essential to ensure that teachers have access to current materials and tools that support their pedagogical work. Incentives for teachers to explore new applications and teaching methods should also be created, whether through distance learning, online platforms, or other innovative approaches.

Moreover, incentives should be established to engage teachers and staff in active participation in educational projects. Involvement in such projects not only offers opportunities for professional advancement but also fosters the creation of a dynamic and creative learning environment, benefiting both educators and learners.

Overall, targeted investment in the professional development of teaching staff is of paramount importance to ensure high-quality education and to ensure that students are optimally prepared for the demands of the modern world.

Learning Processes

It is necessary to tailor teaching methods to the individual needs and learning styles of students. The diversity among learners requires flexible approaches to ensure that each student is optimally supported.

Teachers must undergo continuous training and learn various teaching methods to convey knowledge in engaging and diverse ways. This promotes active participation and motivation among learners. Expanding the range of teaching methodologies allows educators to develop effective strategies for knowledge transmission and foster deeper understanding. Utilizing different teaching approaches enables students to grasp content in multifaceted ways.

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Targeted professional development of teaching staff in various teaching methods ensures a high-quality educational experience and prepares learners effectively for their future challenges.

Networks and Collaborations

Enhanced collaboration between schools, training centers, and vocational education centers is of great importance to elevate the quality of education. Through close cooperation, synergies can be leveraged to create a more comprehensive and practical educational offering.

Intensifying exchanges with universities, particularly concerning vocational education practices, is crucial. This fosters a stronger connection between theoretical knowledge and practical application, providing learners with a solid foundation for their career paths.

Promoting well-funded international projects for participants and businesses is another significant step. This contributes to increasing the appeal of specific vocational fields while broadening the horizons of participants.

The development and expansion of existing school networks offer students broader access to educational resources and diverse learning opportunities. Such a network also provides a platform for exchanging best practices among different educational institutions.

Encouraging increased collaboration, both nationally and internationally, creates a dynamic environment in which best practices are shared and common goals are achieved. This cooperative approach helps enhance the quality of education and improves the preparation of learners for a successful professional future.

Quality Assurance, Monitoring, Evaluation, and Development Strategies

Ensuring educational quality requires comprehensive quality assurance, monitoring, and evaluation, supported by clear development strategies. International quality standards like ISO 9001 are crucial for meeting educational objectives.

The implementation of the new EFQM system in Finland highlights the need for the highest quality standards. Monitoring and evaluation serve to track educational progress and assess teaching methods. This allows for adjustments to be made to achieve the goals. Quality assurance and development strategies, coupled with international quality standards, form the foundation for an effective education system. This way, educational objectives can be achieved, and learners can be optimally prepared for the future. Overall, these measures can significantly contribute to continuously improving educational institutions and meeting the highest quality standards.

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6. CONCLUSION

The international LTTA brought together dedicated trainers and educators from the construction sector, fostering intensive and constructive collaboration. This collaboration facilitated a deep exchange of their industry-specific experiences and knowledge.

In feedback sessions during workshop activities, participants shared their individual experiences within the group, discussing successful approaches and challenges encountered. They provided constructive suggestions on future industry-relevant topics. The valuable contributions during these interactions spanned a wide range of materials, methods, and tools related to Construction 4.0 technologies, as well as presented solutions for strengthening the institutional capacities (Capacity Building) of educational institutions. These insights serve as a solid foundation for upcoming discussions and negotiations with policymakers.

The LTTA proved to be a significant milestone for expanding the competencies of trainers and educators, particularly concerning the integration of new technologies and digital vocational skills in construction and beyond. The ultimate goal of educators is to convey innovative learning content and increasingly incorporate digital media into their teaching. To achieve this ambition, they must not only master domain-specific learning content but also learn and master the use of e-learning models.

Active participation in this project helped close and minimize existing knowledge gaps. Through collaborative work on the topic, participants from different countries benefited from a diverse range of experiences and expertise that each contributed to the discussions and shared with others. This collaborative approach not only enriches individual skills but also contributes to optimizing teaching and training methods in the construction sector on a global level.

This LTTA event underscores once again the outstanding importance of joint presence projects aimed at exchanging expertise in vocational training. This realization reaffirms the value of personal interaction and interactive collaboration to share expertise and best practices in the field of vocational education.

Furthermore, the LTTA highlights the indispensable role of successful institutional development and capacity-building in the construction sector. This progress necessitates close collaboration both at the European and international levels. The expansion of institutional capabilities and resources in construction gains additional significance through cross-border cooperation and experience sharing with partners from different countries.

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The LTTA thus not only provides an opportunity to share knowledge and expertise within vocational education but also a platform to promote joint efforts to enhance and strengthen the construction industry on a global scale. This holistic approach underscores the importance of collaboration in education to address the challenges of modern construction and prepare future generations of professionals optimally.

The results and insights of this LTTA are also relevant for further projects, as they possess significant transfer potential and strong synergies.

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Coordinator

BGZ Berliner Gesellschaft

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Romania

Mancom GmbH

http://www.mancomgmbh.de/

Finland

JEDU Vocational Educational Centre

www.jedu.fi

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