Designing for effective online Teacher Professional Development (oTPD) in building education by supporting beliefs, communities, collaboration, and development

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Abstract

This article reports the initial research findings from a large project on online professional development and upskilling of in-service building teachers' digital competencies. Based on the results from a preceding literature review and the pilot delivery of the course, three key factors for the design of effective online teacher professional development in building education — beliefs, communities and collaboration, and teaching development — are exemplified and discussed. The article concludes that the pilot was successful in developing the participants' technical skills and competencies to introduce technology in building education; however, the pilot did not significantly influence the participants' beliefs nor made them change practice within the duration of the course.

Keywords

Online Teacher Professional Development, digital competencies, online learning, educational technology, building education, networked lifelong learning.

Background

There is a pressing need to ensure digital competencies in higher education and the use of digital solutions for problem solving and collaboration in the building industry in Denmark (Bolig- og Planstyrelsen, 2020; Lillejord et al., 2018; Transport-, Bygnings- og Boligministeriet, 2019; Uddannelses- og Forskningsministeriet, 2020). As a consequence, the Kompetenceudvikling af Undervisere i Byggeriets Uddannelser (KUBU) project was initiated in 2020 to support the in-service building teachers' professional development of digital competencies across disciplines related to building, construction, engineering, and architecture.

KUBU is designed as a flexible online course in Brightspace (Figure 1) and consists of four modules: (1) Overview of the potential of digitalisation in the building industry (8 hours), (2) Training skills on specific digital tools in the building industry (8 hours), (3) Online pedagogy, online communication in teaching (8 hours); and (4) Developing online teaching focusing on digital technology in building industry (16 hours). Thus, the total workload is estimated to be 40 hours, which are distributed over 2–3 months.

To inform the design of an effective course, the project included a large-scale literature review on factors for effective online teacher professional development (oTPD) of digital competencies in higher education. The review identified 16 underlying factors related to the institutional, course design, and course delivery perspective (Godsk & Nielsen, 2022). In particular, three of the factors related to course design of oTPD were significant in the literature: (1) the participants' beliefs about and attitudes towards teaching and learning with technology (identified in 9 of 45 articles), (2) the support for their individual teaching development (identified in 14 of 45 articles), and (3) communities and collaborative learning (identified in 14 of 45 articles) (Godsk & Nielsen, 2022). This article briefly describes how KUBU is designed to support these factors as well as the impact of the design on the participants based on a pre/post survey with Likert scales on their view on

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technology, collaboration, knowledge sharing, and change of teaching practice. 11 out of 11 participants completed the pre-survey, and 8 out of 10 completed the post-survey (one dropped out) equivalent to a response rate of 80–100%. The respondents originated from seven different programmes and six different institutions.

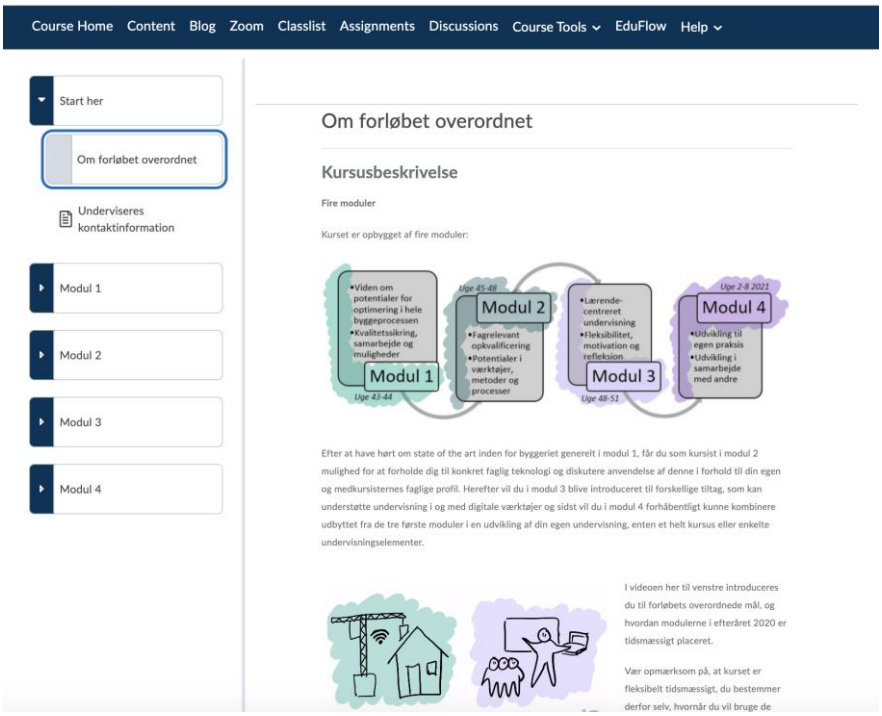


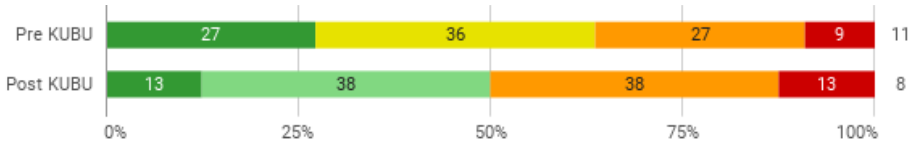
Figure 1. Screenshot of the KUBU course welcome and course description page.

Beliefs about teaching with technology

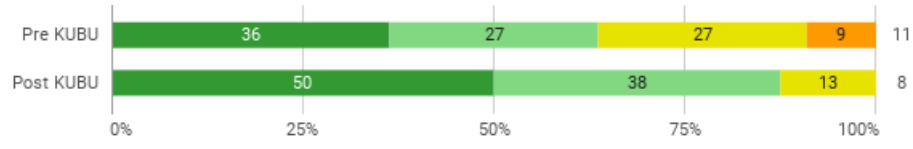
Teachers' beliefs about and attitude towards teaching and learning with technology are highlighted as essential for effective TPD initiatives on technology (Godsk & Nielsen, 2022). Thus, it is important to support a positive attitude and design for change of practice and beliefs. In the context of KUBU, this was supported by videos with experts on state-of-the-art digitisation in the building industry, trialling of new digital tools, six discussion activities, and sharing of development ideas. The participants had to describe their idea of pedagogical development and give feedback on others' ideas. The purpose of this activity was to encourage the participants to start developing and reflecting on their teaching.

The pre/post survey addressed the participants' change of beliefs using five core values from the technology acceptance model (TAM, Scherer et al., 2019): perceived usefulness (PU), ease of use of the technology (PEU), attitude (ATT), behavioural intention (BI), and actual (perceived) use (USE).

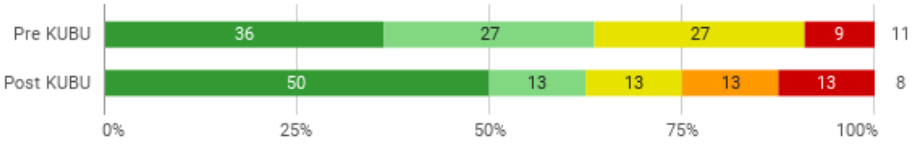
I find it easy to integrate technology into my teaching (TAM PEU)



Technology has a positive influence on students' learning (TAM PU)



My teaching improves when I use technology (TAM ATT)



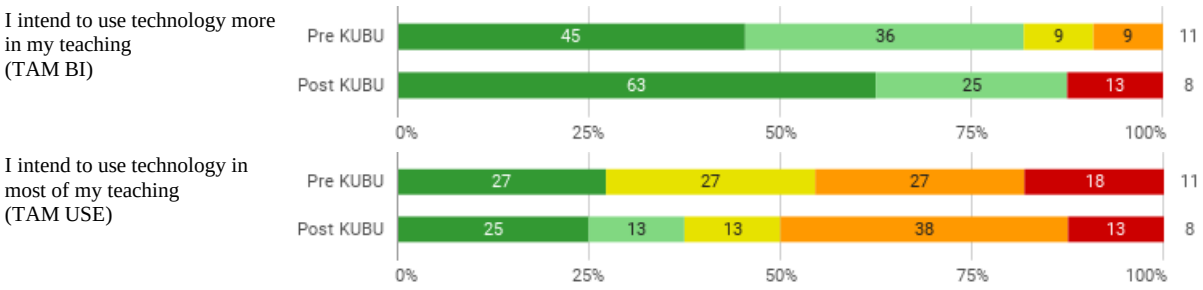


Figure 2. TAM scores pre and post KUBU.

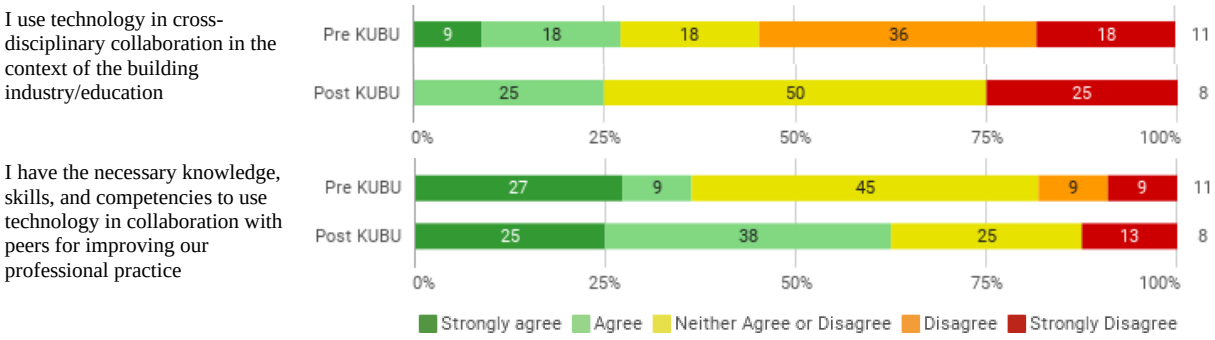
The survey revealed increased perceived usefulness (PU) and ease of use of the technology (PEU), whereas the attitude (ATT), behavioural intention (BI), and actual (perceived) use (USE) were not significantly increased (Figure 2). The TAM scores suggest that beliefs did slightly change in favour of the use of technology in teaching during the course. However, the attitude, intention, and actual use did not increase during the course, which stresses the importance of designing for a change in beliefs that may occur later — e.g., when the participants are experiencing the impact of the technology in their teaching practice.

Community and collaboration

KUBU supported community-building among the participants as well as with peers not involved in KUBU, and collaboration among the participants. Within the course, the community-building was supported through a scaffolding process inspired by Salmon's five-stage model (Salmon, 2004), where the participants start socialising and exchanging information in Module 1 and end up with constructing knowledge based on dialogue between the participants and online discussions related to their teaching practice and redesign with peer and moderator feedback in Module 3 and 4. This is not only useful to support the participants' learning process but also to demonstrate how participants can benefit from a peer community. In total 10 out of 21 activities included a peer collaboration element, ranging from one out of five activities in Module 1, two out of six activities in Module 2, three out of four activities in Module 3, to four out of six activities in Module 4. In most activities with peer collaboration, the participants were either encouraged or requested to respond to others' contributions and were free to respond to contributions from their own or another institution. However, in practice, the participants seldom responded to contributions and typically only to posts related to their institution. Whether or not the participants would build or engage in a local community after KUBU was not directly supported in the course and would depend on the individual institutions. However, KUBU explicitly encouraged the participants in the activities to contact peers for technology support, discuss ideas, and/or share their redesigned teaching in Module 4 in a Padlet so that future participants (and others) could benefit from this:

> 'To create a permanent/sustainable change of practice based on the work in Module 4, we will finish the course by you sharing your work so that others can be inspired by your efforts in the future'.

The surveys addressed the participants' community-building and collaboration using two pre/post Likert questions and two post questions on sharing outcomes (Figure 3).



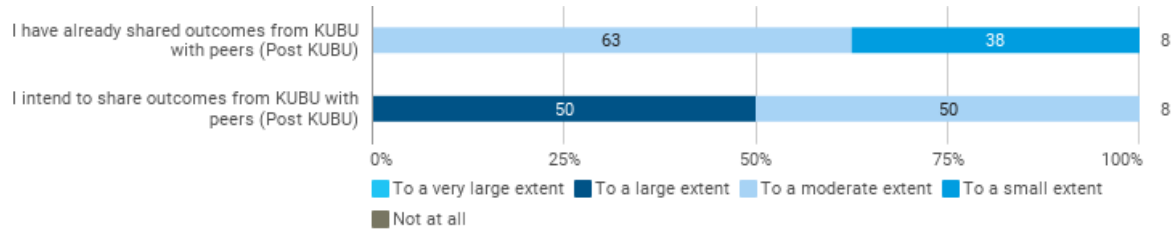


Figure 3. Collaboration and sharing scores.

The surveys show that the skills and competencies for using technology in collaboration with peers have increased. The participants have not yet significantly increased their collaborative use of technology; however, the participants have to some extent already shared and to a large extent intend to share the outcomes from KUBU with peers after the course.

Individual teaching development

An overarching purpose of KUBU and the theme in Module 4 was the participants' individual redesign/development of their teaching practice involving technology. In Module 4, the participants were asked to qualify the pedagogical ideas of the design, develop the teaching materials, document, and share the design using a template that captured the purpose, content, form, relevance, student activity, communication, supports, timeframe, and feedback aspects. Despite only two out of ten participated in the discussions and feedback activities and only one developed actual teaching materials, nine participants ended up sharing their individual redesign/teaching development after several reminders.

The post-survey confirms that KUBU did not yet result in a major redesign of the participants' teaching, but the results suggest a potential inspirational effect on ¾ of the participants' teaching form (e.g., activities, support, and use of technology) (Figure 4). The limited effect on actual teaching practice may be explained by the duration of the course (2–3 months), which makes it logistically difficult to redesign a practice within this short time frame.

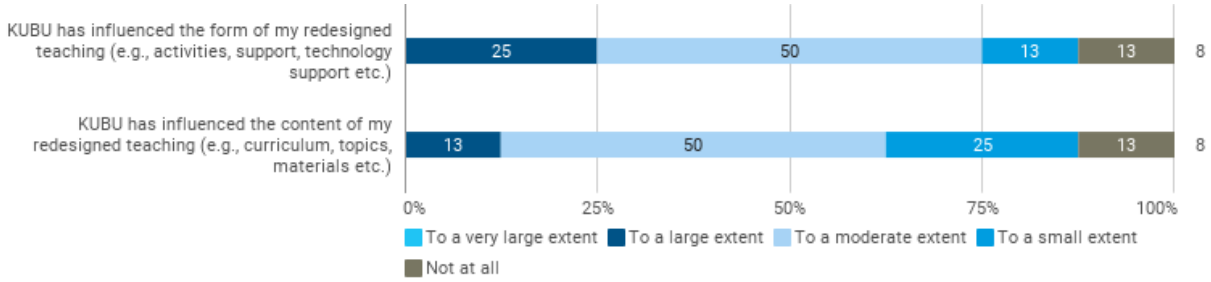


Figure 4. Influence of KUBU.

Conclusion

The KUBU pilot revealed that some aspects of the three key factors for effective oTPD were improved/changed during the course, including collaboration and technical skills and competencies, while others, such as individual teaching development and attitude towards technology, were not. That is, the results suggest that the participants obtained new technical skills and competencies useful for introducing technology in their teaching practice, but also that KUBU did not fundamentally change their beliefs about the technology in teaching and learning nor made them change their practice within the duration of the course. However, the participants did express intentions for using outcomes from KUBU in their teaching and collaboration with colleagues. Thus, it is important to follow up on the teaching development at a later time (e.g., one year later), when the participants have had the opportunity to implement their design in practice. Furthermore, it is important to acknowledge that fundamental change of beliefs may not occur before the participants experience positive effects on their teaching practice and thus not change before the teaching development is implemented (Guskey, 2002). In other words, providing a course like KUBU may result in oTPD but does not guarantee educational development and technology integration. Thus, an extended duration of KUBU, as well as a better integration with existing educational development practices, communities, and leadership at the local institutions, would benefit KUBU. In addition, KUBU itself may be fine-tuned to better fit the needs of the participants by shifting to an easier-to-use learning platform better suited for networked learning activities such as collaboration and peer feedback.

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