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# IF THERE IS WILL THERE IS A WAY: ENHANCING HE TEACHERS' SELF-EFFICACY IN INTEGRATING DIGITAL TECHNOLOGIES INTO TEACHING

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## **Abstract**

This paper discusses the impact of higher education teachers' self-efficacy on the use of educational technologies. It addresses the measures educational institutions can take to strengthen their teachers' self-efficacy in the use of ICT while levelling up their digi-pedagogical competencies. The theoretical part reviews articles and literature related to the topic. The empirical part of the paper presents suggestions for a strengthening teachers' self-efficacy, based on research findings and experiences gained in faculty training in digital pedagogy.

The integration of digital technologies into teaching requires the teacher to possess several skills or competencies. The two best known frameworks to describe the competencies are the TPACK and DigCompEdu models. The TPACK model by Mishra and Koehler draws on the interplay of three primary forms of knowledge: technological, pedagogical, and content knowledge [11]. The DigCompEdu framework by Redecker offers another reference describing what it means for educators to be digitally competent [13].

Apart from the knowledge, skills and demographic factors, there are also other important elements that relate to the level of technology integration: teachers' attitudes, digital competence, and adequate access to digital technology [4], [9]. The attitude can be seen as an intrinsic condition for applying digital technologies. Other such factors are teachers' confidence, beliefs, and the perceived value of technology [5], [6]. Previous research has shown that even when teachers have similar knowledge and skills, the ways of teaching can be different depending on teachers' different beliefs [10].

Teachers' self-efficacy is a key factor in integrating digital technologies into teaching because it comprises individuals' resilience and perseverance in facing challenging situations and problems [7]. For this reason, teacher's self-efficacy should also be enhanced as part of the training and coaching programs. In addition to technological and pedagogical support, personal support—such as peer collaboration and coaching—is needed when digital technologies are integrated into teaching [8].

At Laurea University of Applied Sciences, Finland, the continuous digi-pedagogical training, and peer collaboration have been important forms of support for in-service teachers. Laurea's experiences show that for enhancing teacher's positive attitude towards technology and self-efficacy it is recommendable to have a systematic approach with a medium/long term perspective, to use multiple channels for support, to promote personalised peer support, and to encourage collaborative learning via communities of practice.

Keywords: Digital pedagogy, Digital competence, Higher Education, Self-efficacy.

## **1 INTRODUCTION**

In the aftermath of the COVID pandemic the reluctance to use digital technologies has diminished drastically among teachers of all levels. During the pandemic teachers were challenged to expand their use of ICT in their teaching practice and the learning curve was high. Today digital competence can be regarded as a corner stone in teaching practices since it combines technical mastery with pedagogical purposes to offer a high-quality learning experience. Also, many of the external barriers (hardware, software, access, and support) impacting teachers' uses of technology have been eliminated [6].

To use technology in the best possible manner, it is important that the teacher is motivated to accept the technology and develop confidence to continuously explore new ways to use it [7],[14]. However, some teachers are more willing than others to integrate ICT in their teaching practices. An important reason for this may stem from the internal barriers such as teachers' confidence, attitudes, beliefs, and the perceived value of technology. Teachers' beliefs and attitudes as well as their knowledge and skills

may form a strong barrier impeding the use of ICT. [6.] All in all, various researchers have acknowledged that attitudes and beliefs have a powerful influence on teachers' behaviours [4], [7], [9], [10], [12].

This paper discusses the impact of higher education teachers' self-efficacy on the use of educational technologies. It addresses the measures educational institutions can take to strengthen their teachers' self-efficacy in the use of ICT while levelling up their digi-pedagogical competencies. The theoretical part reviews articles and literature related to the topic. The empirical part of the paper presents suggestions for a strengthening teachers' self-efficacy, based on research findings and experiences gained in faculty training in digital pedagogy.

Bandura has defined the perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" [2]. It reflects confidence in the ability to exercise control over one's own motivation, behaviour, and social environment [2]. In comparison with self-concept, self-efficacy is more future oriented and less concerned with what skills and abilities individuals possess. It considers more important what one believes he/she can do with the skills and abilities one has [3],[20]. Self-efficacy is not a permanent concept, but the individuals' assessments of their own survival can change, for example, because of positive experiences and skills development [2].

Teachers' perceptions of self-efficacy are seen to arise and develop under the influence of four factors: enactive mastery experience, vicarious experience, verbal persuasion and support from colleagues, and physiological reactions of teaching situations [2].

Each teacher has a unique belief of his or her capabilities and self-efficacy [16]. Teachers with a strong sense of efficacy seem to exhibit greater enthusiasm for teaching and do more planning and organization. They are also more open to new ideas and willing to play with new ideas and methods, to meet the needs of their students. Additionally, efficacy beliefs influence teachers' persistence when things do not go as planned. Teachers with a high sense of efficacy have more resilience in the face of setbacks and are less critical of students when they make errors. [16.] Several studies have found that teachers' self-efficacy predicts teaching practices as well as student learning, and it has also been shown to predict student motivation and achievement [15], [20].

## **2 FACTORS AFFECTING THE LEVEL OF TEACHER'S TECHNOLOGY INTEGRATION**

The factors influencing teachers' approach for integrating digital technologies at their work can be categorized in three groups: demographic characters, digi-pedagogical competencies, and motivational factors. They are described in the following, with emphasis on the motivational factors since they may interfere with teachers' use of technology even when the external barriers are overcome [10].

### **2.1 Teachers' demographic characters**

According to key literature, there is a relationship between the teachers' demographic characters and their use of technologies: age, gender, race, educational level, years of technology use and specializations [19]. In a study directed to teachers of four management institutes in India, demographic characters were found to be affecting the behavioral intent to use technology in teaching. According to it, the readiness, and beliefs of teachers to integrate ICT in teaching were found to be influenced by the work experience and gender. However, the study indicated that there is no relation of self-efficacy and age of the teachers with the behavioral intent to adopt technology. [14.]

### **2.2 Digi-pedagogical competencies**

The digi-pedagogical competencies of the higher education in-service teachers have been analysed and categorized in many different ways. The integration of digital technologies into teaching is the result of multiple motives and attitudes and requires the teacher to possess several skills or competencies. The two best known frameworks to describe the competencies are the TPACK and DigCompEdu models.

The TPACK model draws on the interplay of three primary forms of knowledge: technological, pedagogical, and content knowledge. Mishra and Koehler (2006) developed a teacher knowledge framework (TPACK) to describe the nature of knowledge required from the teachers today. The TPACK model draws on the interplay of three primary forms of knowledge: technological, pedagogical, and content knowledge. However, knowledge of technology is not enough if the teacher does not feel confident in using that knowledge [5]. It has been argued that successful technology integration in teaching requires more than just technological, pedagogical, and content knowledge [18]. The

DigCompEdu framework by Redecker offers another reference describing what it means for educators to be digitally competent [13]. It is different from the TPACK model in the sense that it does not only consider the teacher's competencies but also the students' learning experience and competencies. Although teachers' TPAC and DigCompEdu frameworks are strong enablers for technology integration, still they do not explain why teachers with sufficient knowledge utilize technology differently.

## **2.3 Motivational factors**

Apart from the knowledge, skills and demographic factors, there are also other important elements that relate to the level of technology integration: teachers' attitudes, digital competence, and adequate access to digital technology [4],[9]. The attitude can be seen as an intrinsic condition for applying digital technologies. Other such factors are teachers' confidence, beliefs, and the perceived value of technology [5], [6].

Previous research has shown that even when teachers have similar knowledge and skills, the ways of teaching can be different depending on teachers' different beliefs [10]. Evidence also suggests that self-efficacy may be more important than knowledge and skills among teachers who use digital technologies [5]. Self-efficacy can be developed through positive experiences with technology. Pongsakdi et al. made a study with 98 elementary and lower secondary in-service teachers in Finland. It showed that the impact of digi-pedagogical training depended on the teachers' ICT confidence level. Teachers with low confidence in the use of digital technologies showed an increased ICT confidence level after a training program, while teachers who already had high confidence in ICT use showed no significant changes in their level of confidence. [12.] Another survey by Mannila et al. directed to 530 Swedish kindergarten or primary school teachers indicated that teachers' self-efficacy is a key factor in the integrating digital technologies into teaching because it comprises individuals' resilience and perseverance in facing challenging situations and problems. For this reason, teacher's self-efficacy should also be enhanced as part of the training and coaching programs [7.]

Another survey of Wozney et al. directed to 764 elementary and secondary teachers in Canada revealed that the teachers' expectancy of success and perceived value correlated with the level of computer use [19]. Kaur & Singh carried out research to study attitudes and beliefs of 150 secondary school teachers in India. The findings indicate a need for new ways of teacher training to promote teachers' willingness to use ICT [9].

## **3 RECOMMENDATIONS TO SUPPORT AND PROMOTE TEACHERS' SELF-EFFICACY**

The research evidence suggests that teachers' self-efficacy can be strengthened by promoting their professional development and paying attention to teachers' expectations of success [19]. Kim et al. recommends exposing teachers to experiences that challenge their current beliefs of technology integration and at the same time optimize the beliefs for student learning [10]. Professional training programs should focus on three elements: collaboration and coaching, training, and offering best practices.

### **3.1 Training, peer collaboration and coaching**

It is known that self-efficacy beliefs are constructed to great extent on basis of one's prior mastery experiences [15]. Helping teachers gain successful personal experience (personal mastery) help them to gain confidence [5]. It is therefore necessary to enhance the knowledge of teachers in new technologies and equipment. The findings of Kaur & Singh suggest that teachers should have a proper training and motivation for use of digital technologies [9].

At Laurea University of Applied Sciences, Finland, the development of the digi-pedagogical competence of the staff includes a variety of training activities provided by the Digital Development Unit (dCELL). Laurea's experience in offering regularly digital pedagogy training shows that the use of different digital technologies among teachers has increased. However, it is not possible to know to which extent these tendencies are taking place because of the COVID pandemic and/or the technological development and thus increased digitalization in the education-training process.

The findings of Skaalvik & Skaalvik show that teacher self-efficacy and perceived collective teacher efficacy are positively related. The perceived collective efficiency serves as a normative expectation for goal attainment. This implies that a high collective self-efficacy leads to challenging goals and

persistence in teachers' efforts to meet those goals. [15.] The social influence on the teachers motivates them to adopt technology at work [14]. For this reason, it is recommendable to approach teacher teams for support and offer training in contexts where the teachers can raise their competencies collectively through in-service training. This way they can observe their colleagues managing technology applications which may increase individual teachers' self-efficacy [15], [19]. Making the teachers work in teams is a good way to provide opportunities for observation and to create communities of practice providing mutual support. Through the observation teachers may alter their perception of the usefulness of technology and change their ways of integrating it in the teaching practices. The social influence on the teachers motivates them to adopt technology at their workplace.

At Laurea, the peer collaboration has been an important form of support for in-service teachers. It is organized via a red of 11 lecturers who represent different disciplines and campuses of Laurea. Parallel to their work, these "digi-lecturers" spend part of their working hours supporting and training their peers in integrating technology in teaching and learning.

### **3.2 Offering best practices and social modelling**

Another way to enhance self-efficacy is observing and following the experience of others which Bandura refers to as vicarious experience. It has been found that watching the successes of others improves individuals' experience of their own ability [1]. However, modelling requires a perception of similarity between the model, so that another person's actions can be compared to one's own actions [2]. One of the powerful strategies is to provide opportunities for teachers to observe a variety of examples and models of successful technology integration. A collaborative environment can give teachers more opportunities to obtain needed knowledge and to see successful outcomes of innovative uses of technology [10].

At Laurea, the learning platform allows all teachers to view each other's working spaces for all courses. Access to view all courses enables peer-learning and promotes transparency. On the learning platform there is also a showcase of "Master workspaces" covering most of the fields of training offered at Laurea. These workspaces have gone through a quality check and contain course designs with pedagogical path, updated content and learning tasks. They offer a powerful channel for building, testing, and sharing pedagogic ideas.

### **3.3 Encouragement and nudging**

Persuasive communication and support from significant others are ways to strengthen one's judgement of self-efficacy [2], [14]. Verbal persuasion works best when people who convey the efficacy information are perceived knowledgeable and credible [3]. Self-efficacy is also associated with essentially positive feedback, which has been found to be positively connected to individuals' sense of ability. However, verbal influence does not strengthen an individual's abilities, but rather aims to raise expectations related to goals [2].

According to a study carried out amongst primary and secondary school teachers in the Netherlands, persuasive communication focusing on positive outcomes and skills-based training are recommendable interventions to improve self-efficacy in using digital learning materials [17]. Research carried out by Skaalvik & Skaalvik revealed a moderate but systematic relation between self-efficacy and teacher burnout [15]. Since emotional exhaustion may result in reduced accomplishments, this may easily lead to a vicious spiral [7], [15]. This finding stresses the importance of enhancing teacher self-efficacy. Teachers should thus be made aware of the possible positive outcomes using digital technologies can have for their work and they should be supported in alleviating the negative outcomes such as increased workload [17].

## **4 PRACTICAL TIPS**

In the following a number of suggestions for building self-efficacy in use of digital pedagogies are offered. These suggestions are based on literature and the experiences of Laurea University of Applied Sciences.

- Start with small successful experiences
- Let the teachers' expertise shine
- Give teachers time to play with the technology

- Create a confidential and open atmosphere. It is ok to make slip-ups or fail every now and then, especially when you are trying something new
- Enable a participatory approach and collaboration. Working with knowledgeable peers enables social modelling
- Don't forget the academic freedom: introduce systematic principles but allow still a creative activity that cannot be fully reduced to standard steps
- Build teachers' communities, in order to enhance digital pedagogical skills and the use of digital assessment tools
- Situate professional development programs in context of teachers' ongoing work. Integrate training to regular meetings
- Don't waste time discussing teachers' hourly resources (there is never enough time, and you cannot change that). Teachers must negotiate time or money resources with their supervisors.

## 5 CONCLUSIONS

When developing the teachers' digi-pedagogical competencies it is important to seek to influence positively teachers' attitude, self-efficacy, and beliefs towards using digital technology. In order to enhance teacher's positive attitude and self-efficacy towards technology integration it is recommendable to have a systematic approach with a medium/long term perspective. Teacher's self-efficacy can be targeted by providing them with skills-based training programs. It is also advisable to use multiple channels for support, to promote personalised peer support, and to encourage collaborative learning via communities of practice.

The relationship between teacher's self-efficacy and the use of digital technologies in teaching practice needs to be further studied. Does a positive self-efficacy contribute to a high level of confidence in the use of digital technology? Previous research shows that this could be the case, but it is difficult to prove as there are many other factors affecting the teacher's behaviour. Besides, self-efficacy may not be enough: teachers need to value technology as an instructional tool. In any case, the role of professional development programs promoting teachers' digi-pedagogical skills is essential. The needs of 21st-century learner call for and adequate use of technology in teaching practices.

It needs to be noted that the research evidence presented in this article is based on data collected mostly among primary and secondary school teachers. In the higher education context, the evidence of such surveys exists mainly in the field of computer science. However, it is logical to believe that the principles of promoting teachers' self-efficacy do not depend on the educational level nor the substance.

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