Designing a Curriculum for Digital Competencies Towards Teaching and Learning

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Abstract: The COVID-19 pandemic initiated a fundamental change in learning and teaching in (higher-) education [HE]. On short notice, traditional teaching in HE suddenly had to be transformed into online teaching. This shift into the digital world posed a great challenge to in-service teachers at schools and universities, and pre-service teachers, as the acquisition of digital competences was no longer an option but a real necessity. The previously rather hidden or even neglected importance of teachers' digital competences for successful teaching and learning became manifest and clearly visible. In this work, we investigate necessary digital competences to ensure high quality teaching and learning in and beyond the current COVID-19 pandemic. Based upon the European DigComp 2.1 (Carretero et al., 2017), DigCompEdu (Redecker, 2017) frameworks, the Austrian Digi.kompP framework (Virtuelle PH, 2021), and the recommendations given by German Education authorities (KMK 2017; KMK 2021; HRK 2022), we developed a curriculum consisting of 5 modules: 2 for individual digital media competence, and 3 for media didactic competence. For each module, competence-oriented learning goals and corresponding micro-learning contents were defined to meet the needs of teachers while considering their time constraints. Based on three online workshops, the curriculum and the corresponding learning goals were discussed with university teachers, pre-service teachers, and policymakers. The content of the curriculum was perceived as highly relevant for these target groups; however, some adaptations were required. From the university teachers' perspective, we got feedback that they were overwhelmed with the situation and urgently needed digital competences. Policymakers suggested that further education regarding digital competences needs to offer a systematic exchange of experiences with peers. From the perspective of in-service teachers, it was stated that teacher education should focus more on digital competences and tools. In this paper, we will present the result of the workshop series that informed the design process of the DIGIVID curriculum for teaching professionals.

Keywords: digital literacy, digital competences curriculum, online teaching and learning

1. Introduction

The COVID-19 pandemic initiated a fundamental change in learning and teaching in HE, suddenly transforming education into online teaching, challenging in-service teachers at schools and universities, and pre-service teachers with an urgent acquisition of digital competences.

Keeping this as a starting point for our work, our goal is to support pre- and in-service teachers and university teachers in acquiring and developing digital key competences to improve their (inclusive) online teaching and learning. Therefore, we investigated existing curricula including the European DigComp 2.1 (Carretero et al., 2017), DigCompEdu (Redecker, 2017) frameworks, the Austrian Digi.kompP framework (Virtuelle PH, 2021), and developed a curriculum consisting of 5 modules: 2 for individual digital media competence, and 3 for media didactic competence. For each of the modules, we developed a set of topics, linked to well-formulated learning goals. Learning goals are seen as a key factor for effective and successful teaching (Marzano, 2010; Stronge, 2018) as they describe what a learner should be able to do after a specific learning experience. Additionally, learning goals can serve as a guideline of what to learn to complete a course (Bloom, 1956; Krathwohl & Anderson, 2010; Mager, 1962).

In this paper, we present the results of three workshops conducted with university teachers, policymakers, and pre-service teachers. The goal of the workshops was to get insights about the current challenges and needs for

high quality education, and to get feedback for our curriculum, thus, answering the research question: Which digital competences are necessary for pre- and in-service teachers and university teachers to ensure high quality teaching and learning in the virtual world?

2. Methodology

Procedure: We conducted three online workshops. The first workshop (WS1 - 09/21 - co-located with the EC-TEL conference) was held with university teachers and the second workshop (WS2 – 11/21) with policy makers. Both workshops were set up in the same way, in that we gave the participants an overview about the five planned modules and discussed the proposed topics with them. The third workshop (WS3 – 02/22) was conducted with pre-service teachers providing them with an overview of the modules, the respective topics, and the corresponding learning goals.

Method: WS1 was conducted via Zoom, while WS2 and WS3 were conducted via WebEx. For each workshop, we prepared an individual MIRO board (https://miro.com/ - MIRO is an online digital whiteboard) consisting of the following areas: (1) an agenda, an introductory part to set the stage and make the participants familiar with MIRO. (2) The module part, where we briefly presented the modules and invited for discussion. (3) The feedback part asking our participants for feedback regarding the workshops and activities done.

Participants: In WS 1, three university teachers (2 Germany, 1 Belgium) participated. WS 2 was attended by two policymakers (1 Austria, 1 Germany), and in WS 3, we had 8 pre-services teachers (4 Austria, 4 Germany).

3. Results

In WS1, the participants highlighted the following competence needs. In the first lockdown they stated that teachers were overwhelmed with the situation. The participants mentioned that they would need more Moodle competency, and especially experts that support teachers in using Moodle regarding available tools and features. Additionally, they referred to a lack of competences on how to do digitally supported (summative) assessments in education staff. Moreover, the lock-in effect - namely knowing one tool is fine but they are not able to transfer this knowledge to another tool - was mentioned. Regarding the DIGIVID curriculum, they would like to have a curriculum with basic information literacy, deeper insights into technology, and knowledge about why which type of technology is useful for teachers.

In WS2, on a meta-level, the policymakers stated that there is an urgent need to promote teachers' basic didactic understanding, including didactic models in relation to digital online teaching and learning. Thereby, a focus should be put on the differences to traditional views. Regarding the DIGIVID curriculum, one topic of crucial relevance is to make copyright and data protection clear in the development of tools and content. And finally, they suggested establishing a kind of "community of practice for teachers" for exchanging experiences and for the transfer into practice as "*practice is important for the teacher and increases confidence and their repertoire*".

In WS3, we asked pre-service teachers for their competency needs regarding their experience from their educational perspective as a student and from their practical perspective as a teacher. From their educational perspective, they needed knowledge on how to deal with programs, including relevant opportunities and risks. One participant stated: "*It is assumed that everyone can do everything and use the tools without any problems*". They would like to know how to make digital teaching safer, and what challenges and pitfalls exist in this regard. From their practical perspective, i) they would like to know how they can teach digital skills to children in distance education, ii) they wish to use different digital tools for designing a lesson, and iii) they would like to embed digital competences for formulating digital learning objectives in the curriculum or school. Regarding the modules of the curriculum, we received the following suggestions. For Module 1 - Basic Computer Literacy - on the topic information search, they highlighted the transfer into practice and opt for search exercises. Regarding the topic of communication and collaboration, they would like to learn more about online clouds including sharing and privacy aspects. For Modul 2 – Reflecting on Digital Lifeworld - they suggested practice-relevant areas, such as emerging phenomena and real problem cases, role models and possibilities for (self-) reflection. Regarding Modul 3 – Designing Digital Materials - they highlighted the topic of licenses, especially regarding "*what content am I allowed to digitize at all*". Finally, for Modul 4 – Teaching and Learning with Digital Media – they stated that there exist a huge variety of tools in the internet and in terms of

this variety, they would like to know what exactly they can do with what and, most importantly, *"how fast and simple it can be done in the classroom".*

4. Discussion

The workshop results confirmed that the sudden shift from traditional teaching to online learning and teaching was difficult and has raised the urgent need for the acquisition of digital competences. Regarding our curriculum, we received valuable insights: First, in all workshops the participants stated that there is a need to not only provide theoretical knowledge but also to transfer this knowledge into practice. This means to offer educators a kind of community of practice and time for reflection. We are aware that this is not something that could be directly included in our curriculum per se. Yet, we will insert in the curriculum beside factual knowledge but also practice-related tasks. The second identified relevant topic deals with licenses, copyright, sharing and data protection. Therefore, we will add this topic as a focus topic in our curriculum. Third, to support educators while teaching, we add a toolbox consisting of different tools (related to specific topics) from which they can choose what they need for their online teaching.

Limitations: Due to COVID-19, the number of our workshop participants was rather low. In WS 1, only 3 out of 20 officially enrolled participants participated. However, the results show that our curriculum goes in the right direction, but more in-depth analysis is needed to confirm the usefulness of the curriculum for conveying basic digital competences for teaching and learning.

5. Conclusion

In this paper, we presented the results of three workshops to improve the DIGIVID Curriculum, a curriculum that supports in- and pre-service teachers and university teachers in acquiring digital competences for teaching and learning. The results show that our 5 modules of the curriculum seem to be very promising for our target groups. We received valuable feedback on how to improve the curriculum, such as i) to bring theory into practice (e.g. a community of practice), ii) focusing on a topic covering licenses, privacy, security, and data sharing, iii) to offering different tools that can be applied into lectures. Nevertheless, the content of the curriculum is kept that general so that it can be used by other educators as a baseline for teaching digital competences where applicable.

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