



Educating for Professional Digital Competence? Exploring Teacher Education in a New Learning Space

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INTRODUCTION: DIGITAL TRANSFORMATION AND NEW LEARNING SPACES

In the Nordic countries, significant digital transformation that impacts the learning spaces has been observed in schools. This means that student teachers are expected to become professionally digitally competent, meaning to gain proficiency in general digital competence as well as subject-specific professional digital competence and professional knowledge and skills (Kelendric et al., 2017; Tømte et al., 2015). The present study sets out to explore one unique classroom, *Undervisningsverkstedet*

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(‘teaching lab’, henceforth abbreviated as UV) which constitutes a newer initiative within teacher education at a Norwegian university. UV includes a location and resources for varied student-active teaching and to foster professional digital competence (PDC). The location has flexible furnishings and includes resources such as interactive whiteboards, programming and coding equipment, software and apps for gaming, tablets, drones, podcast equipment, scissors, crayons, and pipe cleaners. As a campus-based physical learning space, the UV can facilitate the preparation of student teachers for their future profession. In an international context, this type of classroom is known as a ‘future classroom lab’ and was initiated by policymakers of the European Schoolnet¹ back in 2012. The objective was to develop skills and competences for the future through the exploration of new learning methods in new learning environments (Göçen et al., 2020; Sardinha et al., 2017). Moreover, this initiative aimed to foster active student teaching and learning through redesigning the classroom environments to include various activity zones for different teaching and learning activities, such as focusing on distinct subjects or themes or exploration, production, feedback, and presentation (Arstorp, 2018). Since their advent in 2012, these types of classrooms have spread across Europe, yet they mostly target schools and libraries (Sardinha et al., 2017). However, in 2022, most Norwegian higher education institutions (HEIs) that offer teacher education have established this type of learning environment for student teachers and teacher educators as an integrated part of their campus-based learning environments. Similar initiatives have been observed across the Nordic countries, for example, the FCLab serves as a nationwide network of future classroom labs in Finnish HEIs and teacher education programmes. In Denmark, an FCLab is hosted by the Educational Resource Centre and the Department of Didactics and Digitization at University College Copenhagen. Despite the various technical and practical solutions for the design and organisation of these classrooms, they share some common features: (1) serving as a place for challenging the traditional roles of teachers and students, (2) having different zones that allow for practicing various pedagogical ideas, (3) employing student assistants to manage the space and support the pedagogical and technological needs of the users, and (4) inviting established teachers from the district to come to try out new tools and devices

¹ The European Schoolnet includes 33 European Ministries of Education that aim to bring innovation in teaching and learning to key stakeholders (<http://www.eun.org/>).

for teaching and learning, thereby becoming ‘a resource for the community and not just teacher education’ (Arstorp, 2018, p. 2). Nonetheless, there is still limited research on how these new classroom organisations are perceived and used by teacher educators, student teachers, and local schools. This chapter aims to explore teachers’ perceptions on the promotion of professional digital competence for student teachers in this new learning space/classroom.

Our two guiding research questions are: (1) how teacher educators plan to use UV as part of their teaching and (2) what they expect students to learn in this type of learning space/classroom. The work presented here derives from a broad study with various types of data, including observations of four UV sessions, each with a different group of 15–16 student teachers, interviews with the three teacher educators who accompanied the students, and interviews of the three student assistants employed at UV. This chapter is focused on the interview data obtained from the three teacher educators.

THE DIGITAL TRANSFORMATION OF TEACHER EDUCATION IN NORWAY

In Norway, teacher education programmes are provided by HEIs, which follow national guidelines for teacher education for primary, lower, and upper secondary education. Moreover, these programmes ought to address the ability of student teachers to critically assess when and how information and communication technology (ICT) should be used to promote learning and support learning outcomes. Student teachers should also be taught about ethical and legal issues such as copyright and privacy issues (Kelendric et al., 2017). Teacher education institutions are facing many challenges in trying to provide future teachers with all the skills that together constitute professional digital competence (Lindfors et al., 2021; Olofsson et al., 2021). Moreover, the national authorities have high expectations for teacher education programmes and their capability to meet these new dimensions of the teacher role (Arstorp, 2021). One initiative is the creation of this new type of technology-rich classroom, which follows the guidelines and templates of the Future Classroom Initiative from the European Schoolnet (Arstorp, 2018; Göçen et al., 2020).

UNDERVISNINGSVERKSTEDET AS A FUTURE CLASSROOM LAB

The UV constitutes one higher education institution's interpretation of a future classroom lab. FCLab classrooms usually have different zones to enhance various teaching and learning activities, such as distinct subjects or themes and techniques of exploration, production, feedback, and presentation. At the UV, these zones are called 'stations' that students may move between, either randomly or by following a plan. The UV includes flexible furnishings, including tables and chairs with wheels, that can be easily rearranged for diverse purposes. Nonetheless, the room is often set up with predefined stations maintained by the staff of the Faculty of Teacher Education responsible for the room. Each station offers distinct resources that students can familiarise themselves with. Figure 4.1 demonstrates some of the resources provided by the UV.

The learning environment that the UV offers is designed to help students understand student-active learning in detail through their own experience and practical testing of various resources. Practical testing of various resources and the associated reflections can increase understanding of the knowledge domain in question and strengthen didactic reflections (Rands & Gansemer-Topf, 2017). Such practical experiences are central to how both students and teachers evaluate further use of resources in the



Fig. 4.1 Undervisningsverkstedet (Source <https://my.matterport.com/show/?m=1oCzzy1ExpD>)

classroom setting. While the UV can be used by students for individual activities, the collaboration element is an integral part of the designed learning environment. The ‘open-space’ characteristic of the UV also facilitates interaction across the room.

UNDERVISNINGSVERKSTEDET AND FUTURE CLASSROOM LABS AS LEARNING SPACES

To understand the learning potential that comes with the FCLab and UV, it is worth looking at the emerging research that addresses so-called ‘learning spaces’ (Donkin & Kynn, 2021; Ellis & Goodyear, 2016). These multidisciplinary studies explore how various environments and contexts influence learning. Ellis and Goodyear (2016) suggest three practical and two theoretical arguments for promoting research that addresses the implications of physical environments for learning. The first practical argument is that after the emergence and spread of Massive Online Open Courses (MOOCs) and the related investments in digital infrastructure for providing them, there is a renewed interest in understanding the use of physical space in HEIs for teaching and learning. According to Ellis and Goodyear, it might be worth further exploring the benefits of learning in various physical environments compared with online offerings. While their paper was published in 2016, Ellis and Goodyear’s argument became even stronger after HEIs around the world started puzzling with the ‘emergency remote teaching’ caused by the pandemic. One key issue has been the advantages and challenges of online teaching for teachers without prior experience, and another is the benefits of campus-based teaching and learning (Bond et al., 2021; Karakaya, 2021).

In the second practical argument, Ellis and Goodyear (2016) state that the increasing number of students accessing HEIs requires better use of the physical space of a campus, which again leads to exploring how digital technology may ameliorate this situation. In addition, the growing diversity of student populations together with a pedagogical shift towards more student-oriented teaching methods has put pressure on the use of campus physical spaces (Boys, 2015). Their third practical argument suggests that it could be interesting to investigate how the physical organisation of a campus may foster a closer connection between research and teaching (Furlong, 2012).

In their first theoretical argument, Ellis and Goodyear (2016) suggest that the learning spaces in higher education remain under-researched

and that the existing research has limited theoretical grounding. They also recommend that higher education researchers look to the existing research regarding learning spaces within school systems. We believe this second theoretical argument is particularly relevant for our research on teacher education as we observe students being educated to become schoolteachers who will teach in the physical environments of schools. In the Nordic countries, digital transformations are apparent in schools and other forms of compulsory education and certainly impact their learning spaces. Student teachers are expected to become ‘professional digital competent teachers’ (Kelendric et al., 2017; Tømte et al., 2015) and the UV as a campus-based physical learning space may facilitate the preparation of student teachers for their future profession.

The distinction between *studying* and *learning* is important to consider when describing learning spaces. The term *studying* focuses on students enacting their role as students and fails to address the question of whether the students are achieving any specific learning outcome whereas the term *learning* is focused on understanding, acquiring a skill, or sometimes even changing attitudes. Ellis and Goodyear (2016) argued that university spaces should not only accommodate studying but also support effective learning. Another observation from recent studies on classroom design is that the resources within an environment, such as various digital devices, can enable engagement and collaboration (Jeong & Hmelo-Silver, 2016). Following this, researchers have suggested that learning outcomes can be improved by investing in technology-enabled collaborative learning spaces for professional educational study programmes, as engagement and a sense of professional practice are enhanced by active learning in technology-rich learning environments (Donkin & Kynn, 2021). For professional educational programmes, such as teacher education, this can help student teachers gain insight into how to develop as professionals in their teaching with digital resources.

Ellis and Goodyear (2016) have also been influential to our work in how they, inspired by Sfard (1998) and Paavola et al. (2004), metaphorically approach learning spaces as either learning as acquisition (Sfard), as participation (Sfard), or as knowledge creation (Paavola). For example, thinking of learning spaces solely within the acquisition metaphor would limit their use for just enabling the acquisition of knowledge and skills. With this approach, bringing student teachers to the UV would not necessarily provide them with any practical experience other than testing out diverse tools and resources. Using the participation metaphor, on the

other hand, would allow the space to be used both for ‘enabling social and/or epistemic practice’ (Ellis & Goodyear, 2016, p. 8) and learning how to use available the tools and resources that are involved in the actual practices. In our study, this could mean the methods that student teachers use to master diverse tools and digital resources to experience how schoolteachers can develop professional digital competence. We also suggest that joint reflections between student teachers and their teachers may contribute to new insights.

Learning as knowledge creation suggests the creating of new tools and understanding how ‘to build or reconfigure work/learning spaces’ (Ellis & Goodyear, 2016, p. 8). In the UV, an example of this approach could be when a student teacher constructs a new resource (e.g., podcast, videos, apps) that they can use in their own student teaching, as part of their education, or with future pupils as schoolteachers. Our analyses are inspired/influenced by these three metaphors for learning.

RESEARCH APPROACH: STUDENT TEACHERS WITH THEIR TEACHERS IN THE UV

As part of a campus seminar, teacher educators brought their first-year student teachers to the UV. The students were divided into groups of 15 that each spent one hour in the UV. The aim was to familiarise the students with this new learning space/classroom. The students were just five weeks into their teacher education programme and were yet to attend their first work-based period in schools. Due to the Covid-19 pandemic, half of them had only met online prior to this day on campus, while the other half had had campus-based lectures and seminars from the start of the course. They had their UV sessions in these existing groups, meaning that the two groups only met face-to-face that day while the two groups had met several times on campus prior. The teachers did not further divide the students before they entered the room; they formed groups spontaneously, according to their interests, at the stations prepared for them.

These sessions at the UV had an open character in that the students were allowed to choose among the suggested stations. They did not receive any rigid task or instruction from the teacher or the assistant on what type of conclusion or product they were expected to achieve when the session ended. Instead, they were free to choose how to explore and use the selected tools at hand. Each station included brief instructions

on how to start working with the tools and devices and suggested a few tips that could help the students explore their functionality. The student assistant and the teacher were always available for help.

After the sessions, we interviewed the teachers who came with their students. The two main reasons we wanted to learn the teachers' perspectives and their motivations for bringing their students to the UV were because the UV is new at our university, and to our knowledge, they came without guidelines for their students on how to use UV.

Teacher Interviews

The three teachers interviewed were all affiliated with a joint pedagogy course for first-year students within a teacher education programme (5th–10th grade) at the university. The teachers had varied academic backgrounds; one (T2) had previously worked as a schoolteacher, while the other two had not. The interviews were semi-structured. The first teacher was interviewed both prior to and after the UV session. The second and third teachers were interviewed only after the visit to the UV. The rationale for selecting these teachers was because none of them had 'specialised' in UV as a learning space but all were positive about using it with their student teachers.

The introductory part of the interview included questions about the teachers' expectations for the UV session in terms of the students' learning outcomes. The main part of the interview was developed around the model of inquiry-based learning, and the questions focused on such aspects as the opportunities students receive for inquiry, collaboration, and reflection while working in the UV. It also included questions about how students were prepared and guided during the session. The concluding part of the interview included questions that encouraged the teachers to reflect on the outputs of the session.

The teachers provided their informed consent prior to the interviews. The interviews were recorded and later transcribed. Data from the interviews were coded by both researchers following the content analysis approach (Krippendorff, 2018). We read the interview transcripts with different reading techniques, such as wide and narrow reading (Krippendorff, 2018); based on this, we developed several categories that emerged as relevant to the overall aims and scope of our study, such as initial plans for the session, expected outcome from the session, perspectives on collaboration, use of digital technology, and the like. As part of a

later close-reading process, we identified subcategories to give more detail to the larger categories. For example, in the category regarding initial plans for the session, we identified several subcategories like ‘having fun’, ‘learning about the UV and its resources’, and ‘exploring the new devices and tools used in schools’; likewise, subcategories were developed for the category of expected outcome. The process, categories, and subcategories were discussed and agreed upon by both researchers and thus serve as empirical contributions to our research questions. In the following sections, we will elaborate on these findings. The quotations have been translated from Norwegian to English by the authors.

THE TEACHERS’ PLANS FOR THE UV SESSION WITH THEIR STUDENT TEACHERS

The three teachers (T1, T2, and T3) accompanied distinct groups of student teachers to the UV. Even though the sessions were jointly coordinated and planned by all three teachers, the interviews revealed that their individual plans for the sessions varied. For example, they expressed slightly different perspectives on the organisation of the physical learning space, how they wanted their students to use the UV, and their own role as teachers while visiting the UV. The following sections elaborate on their views of these three aspects.

Teacher Perspectives on the Physical Learning Space, Stations, and Available Resources

None of the teachers were involved in the initial dialogue regarding which resources and tools should constitute the stations for the sessions with this cohort of student teachers. T3 commented that the UV accommodates a lot more creativity and flexibility than the usual classrooms in the university, e.g., that it is easy to move the furniture around to facilitate group work, which is often problematic in typical classrooms. Yet, when in the UV, T3 observed that the available stations and their devices did not fully meet her expectations, and she would have preferred additional devices:

Yes, I would have liked for them to try the VR since they really wanted to, and I also wanted them to try the green screen. Neither were available, nor was the 3D printer. I think many of them would have enjoyed trying more, especially the green screen, because it can be linked to absolutely everything.

Thus, it appears that T3 wanted her students access to explore more devices than those that were selected for the UV session, and she saw the specific devices that she mentioned as being highly relevant and/or attractive for them or herself. This was not the case for T1 and T2, who were both content with the available stations and the devices attached to them. Moreover, T1 considered the pre-selection of the stations suitable due to time constraints, saying, '*there are so many stations that students will not have time enough to visit all of them during this first session*'. Time limitations were also addressed as a challenge when offering students access to various stations. T1 said, 'Now they had to choose two stations. When I've come before, we had them try more stations, but it has to do with time'.

Exploring the UV with an Inquiry-Based Learning Approach

All three teachers highlighted that they wanted the students to approach the UV and its stations with an inquiry-based learning approach, and T3, pointing out that the UV as a learning space itself offers this type of approach, said, 'The UV is exploratory in its nature [...]. We certainly do not have that in a seminar room'. While an explorative and inquiry-based approach is grounded in interests and curiosity towards new situations and/or resources, the teachers had slightly different perspectives on this type of approach. All three teachers underscored that the explorative, inquiry-based, and playful approach towards digital resources and UV as a learning space is especially important for first-year students. T2 did not push the students in any clear direction but rather chose to let them explore the possibilities and constraints that come with this type of learning space. The aim was to observe how they engaged with the resources and to help them reflect on why they did so. For example, students with interest in gaming chose the gaming stations, and students interested in media production chose the podcast station. T1 observed, 'there are so many stations that not everyone can attend all of them. That's why it's a bit individual. They can choose what they think is interesting'. However, after the first round, and before the students were to select a new station, T3 chose to guide the students' next steps. When the second round started and the students were to select new stations, T3 motivated them to choose differently and to familiarise themselves with something new. T3 argued, 'they cannot just choose the one thing they really want. They must experience a variety, and they will get some

time for that at each station. Everyone will have access to five stations'. In contrast, T1 maintained the students' availability to choose stations according to their own interests, without any steering from her, and did not consider their choices as a problem at all:

Those who wanted one thing went there, and those who wanted another went there. And it continued like that for one round after another. It went so smoothly that I have not reflected on it. One would think it could be a problem, but it has not been. If one station is full, they see it and adjust. Yes, it has just fixed itself.

Nonetheless, T3 said that by maintaining this perspective, students may end up with just doing what they like to do, and not challenge themselves to learn something new. This approach may hold students in the role of pupils, instead of future teachers, and T3 sees her duty as a teacher educator to raise awareness about changing roles and perspectives. Interestingly, none of the teachers stressed how the UV as a learning space may foster/motivate this inquiry-based learning, other than claiming that the UV fosters 'an explorative approach' (T3). We believe that this experience might be interesting for the students and their teachers to reflect upon. T3 touches on this when she talks about how she could have prepared her students for their UV session as a collaborative event, rather than as individual for each student, and whether this could have triggered a more collective inquiry-based approach and experience:

I think I should have prepared my group to collaborate. Because I had not done that. It might have been different then. Maybe I could have talked a little more with them about it being exploratory, so not just going in as students to have fun.

Nevertheless, the students paid attention to their peers' activities across the stations. This was possible due to the open-space and organisation of the stations across the room. Here, T3 noted that the students were curious about what their peers were doing, especially when there was laughter across the room. Unfortunately, movement around the classroom between stations was limited due to the Covid-19 restrictions.

The time students spent in the UV was primarily used for the inquiry-based activity itself, while most of the reflection took place in later classroom sessions. In her classroom teaching, T1 facilitated students'

reflection on the devices they experienced in the UV and how they could be helpful for teaching the students' specialisation subject, both during their student teaching and in their future work as teachers. T1 noted that a short reflection round was carried out at the very end of the UV session, but that reflection was more for concluding than extending. T3 believed that the UV sessions could be improved by connecting them more directly to pedagogical concepts, e.g., inductive and deductive learning. T3 also said that the reflection could be improved by, for example, giving students questions to guide them while working. In general, T3 thought it would be beneficial for students to receive a concrete task that would make their work more focused.

All three teachers agreed that the UV should be used more often during a semester and not just as a one-time experience. They suggested that it would be a useful hands-on addition for seminars on specific topics (e.g., class leadership or station teaching).

Teacher as Facilitator or Spectator?

The teachers approached their students differently while in the UV. While T1 and T2 held themselves in the background and let students move around to choose stations as they liked, T3 was more actively involved in their station choices and motivated them to choose 'something new'. T2 explained that her reason for staying at the back was that she wanted the students to explore the devices without intervention, saying, 'It's better that I just put myself in the background. They often get a little uncomfortable when we're there, right? They become a little different'.

While the teacher interviews did not provide any direct information on their own PDC, it might be worth considering whether T1 and T2, who kept in the background and left the experiences to students (with some limited support from student assistants), themselves have limited experience with the digital technologies available at the stations. Compared with T3, they were less critical of the actual devices and tools available, and they were also less involved in how their students oriented themselves in the UV. Our data do not give any clear answers to this, but it might be interesting to investigate whether—or how—teacher educators' own PDC impacts their approach towards using the UV.

TEACHERS' EXPECTATIONS OF HOW STUDENTS ARE TO LEARN IN UV

While all three teachers shared an overall understanding of the purpose of the session, namely for students to learn about the UV as a learning space, other motivational factors for bringing them emerged during the interviews. Those were (a) to engage with the digital technology and devices available in schools, (b) to prepare them for their first student teaching placement, (c) to enhance their pedagogical–technical competence, and (d) to simply have fun and socialise. In the next paragraphs, we will elaborate more on those motivations.

How Can the UV as a Learning Space Promote Collaboration and Socialising?

T1 and T2 underscored the importance of their first-year students having fun in this first UV session. Their main argument for this was the pandemic-caused limited access to campus-based socialisation. One said, '[...] just having fun together is important. It does not always have to be linked to subjects. It's possible to have subgoals and get to know each other. They have just started'. T1 and T2 further supported this by saying that the students had told them they enjoyed being in the UV 'for fun'. As previously mentioned, T3 was more hesitant to this open approach, and she would prefer her students to have some tasks while in the UV, since this could have triggered reflection about the benefits of the UV as a learning space:

I actually think they would have gotten more out of that session if they had been given a task. Not one they should answer in writing, but a task that had made them think a little more while they were doing things. They probably had a bit of a 'fun room' attitude when they went in. Yes, that's it. You're supposed to have fun there somehow. But maybe with a little more framework and some requirements, they can think about some concepts that they should be able to articulate afterwards. I think they would have gotten more out of it.

T3 exhibited a more thoughtful approach towards the UV as a learning space. She tried to connect the session to her students' teacher education programme in terms of improving their digital proficiency and demonstrating how the UV may enhance their reflections on their roles as future

professional digital competent teachers. Moreover, T3 underscored the value of the UV as a learning space for students to get a taste of how to organise classrooms to foster collaboration and learning dynamics:

It is a room that invites creativity and I think it is the flexibility, that there are wheels on both chairs and tables, and you can move around. This is super important in relation to cooperation and in relation to being able to think a little outside the box.

Exploration of New Digital Devices and Tools Used in Schools

All three teachers highlighted how the UV as a learning space with a variety of devices and resources may help students learn about digital technologies in schools. They also agreed that it is important for students to visit the UV before their first student teaching placement, so that they can prepare themselves for how technology-rich classrooms may look. T1 said, ‘There are many fine technological things in school. Therefore, this visit has been scheduled before the internship period’. T2’s perspectives align with T1 as she claims:

We started discussing what they [students] learn in practice at schools, and what they learn when they are at [name of the university]. I think it is important that they should know a little about what exists in schools, and not feel that they are lagging in relation to the field of practice. Even if the students are young, and it is only a few years since they went to school themselves, a lot has happened [in the schools].

T3 presents a more nuanced view on the digital state in schools, in that not all schools are fully equipped with digital technologies. She states that ‘The [digital] equipment in the UV does not exist in Norwegian schools in general. Of course, some schools have invested in some equipment, but others have not’. She also commented on how the student assistants working in the UV helped the students to see how they can improvise if the schools they work at do not have the technology they planned for their practice. She said, ‘I think it was very nice that the student staff pointed out that it is possible to make a podcast with your mobile. You do not need a studio or microphones’. Thus, T3 added another perspective to how students may develop their PDC, namely by learning how to improvise when technology fails or is not available as planned for.

T3 pointed out that the reflection at the end of the session was quite challenging, possibly because some of the students saw the room as a ‘future classroom’ rather than representative of the equipment currently available in schools. Thus, some of the students focused on the limitations rather than the possibilities of the different technologies in terms of their practical effectiveness in schools. The role of the student assistants was very important here as they emphasised how much can be achieved without expensive equipment. T3 also emphasised the role of the student assistants as role models for the first-year students to look up to. The student assistants were in their second or higher year of their studies.

How to Use Digital Devices Pedagogically (and Technically)

All three teachers highlighted how teaching with technology includes elements of digital and content competence crucial to the development of PDC. T1 said, ‘We want them to receive as much training as possible in how to facilitate good teaching with the help of digital technology, [...] think carefully about why they do it, and what it is they want with it’. In other words, as part of their teacher training, student teachers need to learn about, and experience, how various digital resources work for pedagogical purposes. Their future professions as teachers will include mastering these resources and adapting them to their own teaching. Thus, the UV serves as an important space for becoming familiar with the educational technology that is already implemented into school contexts. The teachers all agreed that UV visits should be integrated into teacher education so that active trial and error and an explorative approach towards digital resources become embedded in the study programme, as framed here by T2, saying, ‘It takes some time to master the technical sides, and that’s why I think it cannot be just a one-time event. It must be repeated. [...] We do not use things we do not feel safe about’.

One observation is that some of the students did not see how the different technologies could be used for teaching their subject (which may have been related to the nature of the subject). This is another reason why T3 emphasised that the reflection needs to be more connected and relevant to the practice. T3 also pointed out that it is important for the students to first experience all of the available opportunities before they can make an informed judgement of whether a certain technology can be used purposefully in their subject.

DISCUSSION: NEW LEARNING SPACES AND NEW WAYS OF LEARNING?

In this chapter, we have studied a newer learning space at a university campus that is available for the teachers and students of a teacher education programme, and we have discussed how teachers perceive and plan for the use of it. Our aim was to explore teachers' perceptions on how to promote professional digital competence for student teachers in this new learning space/classroom. Our guiding research questions were:

1. How do teacher educators plan for the use of the UV as part of their teaching?
2. What do they expect students to learn in this type of learning space/classroom?

We studied teacher educators' perceptions about how this future classroom lab can promote and enhance professional digital competence by holding interviews with three teachers who had organised sessions at the UV with their students. From our analysis of the interviews, we suggest several areas for discussion, which may lead to important practical implications when it comes to further use of the UV in terms of fostering professional digital competence, and to the design of inquiry-based teaching and learning sessions. In the teachers' plans for the visit to UV with their students, we observed a joint motivation for an inquiry-based approach and allowing for students to move around in the classroom without any guidelines or prepared group organisation. Two of the teachers planned for students to explore the tools and resources that they found most attractive, thereby motivating them to pursue an interest-driven approach, while one teacher used a more steered approach. This teacher was more inclined to align the UV session to the educational programme.

The teacher interviews regarding their expectations for the students learning in the UV revealed that they expected students to familiarise themselves with the UV as a learning space and to try out at least two of the stations offered to them. They also encouraged the students to reflect individually and collectively on their experiences at the stations, but this task was given less attention due to time constraints. If we look at the three metaphors of learning (acquisition, participation, and knowledge creation) and how they can help us to understand the UV as a learning

space, we can recognise elements of all three metaphors in the ways the teachers expected and experienced students' learning in the UV. For example, the acquisition metaphor could be recognised when the student teachers managed to test out the diverse tools and resources within the stations without being fully capable to start using the tools. For example, some students were reported by their teachers as being 'puzzled' about what to do at the station rather than doing what they were expected to do. Nonetheless, according to the teachers, most of the students learned how to use the tools and resources, practised them while at the station, and consequently gained some knowledge on what provides (technical) PDC for schoolteachers. The participation metaphor may serve as a good description for most of the students in that the UV setting enables social and epistemic practice. During their visit, few students had sufficient time to construct new resources for later use, yet some students that attended the podcast station managed to produce a podcast which they saved for later teaching purposes. Here we might interpret their activities in the UV as knowledge creation in that the students were able 'to build or reconfigure work/learning spaces' (Ellis & Goodyear, 2016, p. 8).

CONCLUSION: UV AS A LEARNING SPACE THAT FOSTERS DIGITAL COMPETENCE

This study on the digital transformation of teacher education and the establishment of a new learning space such as the UV exemplifies how professional educational programmes may develop and change as a response to the digital transformation of society. It also demonstrates the value of campus-based learning and how this may be facilitated through the construction of new learning spaces. This is an important observation after some years of emergency remote online teaching and learning caused by the pandemic. Moreover, our study demonstrates that the digital transformation of teacher education affects the role of the teacher and the syllabus, and it may also cause epistemic changes (Lund & Aagaard, 2020). For example, our study indicates that integrating UV sessions with the pedagogy course could be beneficial. This could lead to the design of more authentic tasks that would demonstrate the relevance of the different educational technologies to student teachers and allow them to practice a chosen technology for a specific teaching objective. Instead of treating UV sessions as one-time unique events, the UV could be used several times during the semester in connection with the topics discussed

in the actual course. Moreover, students could be asked to work at the UV to complete compulsory course assignments as part of the curriculum.

This study also shows that this transformation is linked to governmental guidelines and strategies on digitalisation of HEIs, as in our case with the national curricula of teacher education, the national strategies and plans on digitalisation of higher education, and the institutional responses to them. A key message here could be that the HEIs need to support the transformation with adequate digital infrastructure and new learning spaces that enhance active student teaching and learning, as in the case of future classroom labs. Teacher educators should be included in the planning and integration of these kinds of learning spaces/infrastructures and learn how these learning spaces may foster future PDC for teachers. If the teacher educators themselves do not see this potential, this expensive infrastructure may come to no good use. Nevertheless, this study has demonstrated the potential inventiveness that can come from providing digital infrastructure that allows for collaboration with stakeholders outside the university, such as schools, schoolteachers, and school owners.

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