

Working with Digital Devices in Teacher Training Using the Example of the Teaching-Learning-Lab

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1. Introduction

In recent decades, the widespread use of digital technologies has changed the world dramatically. The impact on the economy, social life, and the learner is enormous. Schools, too, are now increasingly trying to use digital technologies and digital tools in the classroom and for learning at home. Among other subjects, language teaching in particular has become a field where digital devices and online tools, as well as apps, can be used in a variety of ways to intensify and monitor the learning progress.

The use of digital technologies has already found its way into continuing professional education and adult education. Even before the COVID-19 crises, the use of digital technology in the educational field increased. Curran et al. (2019) examined the possibility of self-directed learning in adulthood by the support of technology increased. The latter was described as an important resource in many professional fields. Especially, the own laptop and mobile phone are used for self-directed learning by workers in the health sector for professional and adult education and there is still a need to identify credible sources in the internet. However, the use of digital technologies is not limited to lifelong education. Among others, Altuna and Lareki (2015) dealt with the implementation of digital technologies in schools. The study results show that teachers training, comprising theoretical aspects of education and training as well as focusing on the use of digital technology, is needed. Where implemented, positive effects of the use of digital devices were found. For example, Sung et al.'s (2015) meta-analysis showed that language instruction supported by mobile devices has resulted in a meaningful improvement with mean effect size ($d = .55$). Mobile devices, such as mobile phones and tablets had a larger effect on the improvement for language learning than laptops or computers. Furthermore, better achievement was seen in second language learning than in first language learning and the integration of mobiles together with multiple learning and teaching strategies produced higher effects.

Another description of the innovations and changes in teaching and learning of pupils was conducted by Brandhofer et al. (2018) in Austria's National Education Report. The authors examine mobile learning with notebooks and tablets, the digital textbook, augmented reality, e-portfolio, mind and concept maps. In addition, they describe gamification, game-based learning, and educational robotics, Maker Education and the use of the cloud in schools. Brandhofer et al. emphasise that a digitisation strategy can be beneficial for all parties involved if teachers are convinced of the importance of digital media, want to use them in class and are motivated to promote the digital skills of their students (2018, 342). In addition, Sung et al. (2015) point to the importance of enabling language teachers to adapt to mobile assisted language learning (MALL) activities and to reduce the workload of innovative teaching practices. Consequently, it is important that all teachers acquire a certain level of digital literacy and are able to teach with and about digital media. This field of expertise must therefore be increased in teacher education and professional teacher training (Brandhofer et al. 2018, 344). The School of Education at the University of Klagenfurt has regarded these recommendations seriously and provided infrastructure that supports students and teachers at the university in meeting these requirements.

The Teaching-Learning-Lab (TLL) was founded about two years ago aiming to support teachers and students in planning and developing lessons. The teaching-learning lab can be divided into four segments: laboratory, teaching, digitization and infrastructure, and interface and public relation.

Firstly, it can be described as a laboratory. It offers students and teachers infrastructure for conducting empirical surveys and validating empirical methods. The lab also serves as a development environment, where workshops for students and other participants are held. Secondly, it is integrated into regular teaching courses at the university and provides the academics with both analogue and digital teaching media. It offers them the possibility of carrying out the lessons on the premises of TLL, where in cooperation with students and teachers a pool of ideas for innovative academic research papers (Bachelor, Master, PhD) is built. Thirdly, the TLL contributes to digitalisation with its services and provides the necessary technology. It offers equipment with interactive devices for groups in combination with wireless image and sound transmission. Fourthly, it functions as an interface to practice, stimulates the exchange of experience with teachers and paves the way for cooperative projects.

The target group of the Teaching-Learning-Lab service is very broad: students, especially those in teacher training, teacher educators as well as academics from different fields of expertise. Visitors receive counselling on issues of education, the use of digital technology in their classrooms and are given the opportunity to get to know some of the digital devices in a closed space. In this way, many participants overcome their fears and lose their prejudice against using new technologies. Talented and engaged young students find a surrounding, where their research can thrive and their peers or mentors give them the needed support. Moreover, there are opportunities for the coordination between the subjects. Among other things, the aim of the Teaching-Learning Lab is to prepare students for professional practice, especially with regard to the use of digital tools, as well as research and research-based teaching on all aspects of the teaching profession.

2. Utilities

The Teaching-Learning-Lab provides analogue as well as digital media, such as, workbooks, textbooks, teaching games, CDs, radio plays, DVDs or iPads with installed learning apps. All materials — analogue and digital — are available in sufficient quantities, can be borrowed by students or teachers and used directly in class. The available media can also serve as a stimulus to create teaching scenarios and develop ideas for lessons.

2.1. Analogue media

The textbooks and workbooks are partly aimed at specific areas of teaching, but there are also materials that are suitable for many teaching subject. For example, suggestions for motivating lesson introductions in the form of movement games or brain and puzzle games.

Apart from textbooks and workbooks, the Teaching-Learning-Lab provides games that promote learning and cognition. These games can be used in a suitable setting in the classroom to practice grammar, reading and writing as well as oral communication in a playful way. The Teaching-Learning-Lab provides material in the form of games for spatial imagination or learning probability distributions. There is a sufficient number of identical games at disposal to enable teachers to borrow enough games for all their students. Most of the games are published products, but can be adapted to suit the needs of the classroom.

For teachers who are looking for ideas, the Teaching-Learning-Lab also offers a wide range of different radio plays and DVDs which can be used in language and literature lessons. For instance, those who would like to test the reading competence of students can have a look at the large selection of different diagnostic tests. The Teaching-Learning-Lab currently offers competence-specific diagnostic tests that focus on reading comprehension, reading fluency or spelling. Among the established tests are SLS, ELFE II, HAMLET 3-4 or LGVT 5-12+¹. These can also be made available for teaching purposes.

2.2. Digital media: working with tablets

Even though the large number of different materials in the Teaching-Learning-Lab is appreciated by teachers and students, the most important media in the Lab are 25 iPads. These iPads are stored in suitable tablet cases, which make it possible to load, synchronize and transport them simultaneously. The set also includes a Mac Book Pro, with which all 25 iPads can be controlled. The iPads also include Bluetooth keyboards, touch-pens and headphones. With the corresponding Apple TV box, which is connected to the beamer, one can project from any tablet chosen. The aim of acquiring the iPads was to promote digital work in the classroom.

¹ This SLS: Salzburger Lese-Screening für die Klassenstufen 1-4 ELFE II: Ein Leseverständnistest für Erst- bis Siebtklässler, Version 2; HAMLET 3-4: Hamburger Lesetest für 3. und 4. Klassen; LGVT: Lesegeschwindigkeit- und Verständnistest für die Klassen 5-12+

3. Report on the use of digital media

The TLL has now been in existence for about two years. First, the main focus was to procure and categorize suitable material for all teaching subjects in order to provide an attractive offer for students and teachers from various teaching subjects. Especially for the subjects Mathematics, German and English useful and beneficial materials were found quickly. We have been facing difficulties in obtaining materials for subjects not taught at the Alpen-Adria-University of Klagenfurt. The difficulty is to estimate which materials would be of a valuable use for teaching. The second task was to prepare the iPads to be used for teaching; synchronizing them and installing the updates. Problems of all kinds arose in this process. Due to the differing technical equipment available in the classrooms, a scenario once tried out, did not guarantee that the tablets would work in another room.

When the tablets were technically ready for projecting, researching and watching educational videos, weekly workshops were offered on the use of the tablets in class and on viewing materials in order to make the Teaching-Learning-Lab known to students and teachers. In addition, there were separate workshops for classes held, in which the media for each subject were presented and tried out. These workshops were very popular among students as well as teachers and the offer was accepted in many different courses. There was a low number of registrations for the weekly workshops on tablet use so only a few students participated in these. The low participation of students represented a further challenge. The two main reasons for the lack of participation provided by students were the lack of time and the inability to make it to the Teaching-Learning-Lab during opening hours. To counteract this, the Teaching-Learning-Lab now has changing opening hours and the workshops are also offered at different times. The number of students and teachers interested in the Teaching-Learning-Lab has increased since the winter term 2019/20.

Teachers were more interested in the workshops and some committed teachers used the tablets for their courses after they were presented in the workshops. Nevertheless, they also struggled with unexpected problems when using the iPads for teaching. For example, it does not seem possible to work with several tablets on one presentation without technical conflicts. If a lecturer shows a presentation from the Mac Book, students can follow the presentation on the tablet. If the task is set to edit in the presentation through the tablets, any editing from another device will change the original version. This results in many different versions that do not match. Therefore, it is not yet possible to edit a presentation together without technical conflicts arising.

The potential for the use of tablets has been continuously expanded and more and more university teachers are now focusing on teaching with digital media. However, the problem has always remained the same. The enormous effort necessary for preparing, wrapping up and during the lecture stands in contrast to an equal or even lower learning growth among the learners. In addition, the actual time on task for the students is decreased on the cost of unpredicted technical difficulties. These turn out as time consuming since the group has to move to another room. Furthermore, sometimes it turns out that the booked classroom does not dispose appropriate technical infrastructure, which requires an enormous flexibility of the teacher who is forced to make a quick adjustment of the lesson plan.

The tablets offer new and interesting possibilities, including the creation of new learning scenarios, and hence, they can improve learning enormously. However, these possibilities cannot yet be fully exploited because a lot of technical knowledge and time would be required for the preparation. Consequently, it can be stated that the amount of time invested can be seen as a negative side effect. Nevertheless, by constantly working with the tablets, a number of possibilities have been found to use tablets in class in a meaningful and beneficial way, thus creating a balance between preparation time and learning gains. Digital tools, which can be created online in a simple way, make learning and teaching with digital media fast and easy, and learning friendly. A positive aspect is that these digital tools are usually free of charge and easily accessible for everyone.

The use of digital media should not be limited to accelerating and more efficiently achieving teaching goals, but should "significantly expand the target dimensions of teaching" (Krommer, 2020, 21). Teachers often complain that preparing lessons with digital media/tools takes more time than preparing lessons with traditional teaching media. The additional positive effect that digital media and tools can have on learners is not recognized. For the Teaching-Learning-Lab, this means first to offer constant technical support to teachers and students in order to keep the additional effort - caused by the use of tools and digital end devices - as low as possible. Second, it means to test innovative and relevant tools in advance in order to detect possible difficulties in certain environments and to determine the teaching suitability of these tools. Third, it means to point out methodologic possibilities offered by tools. Often, their functions are presented and analysed on a superficial level, whereas a link to the methodology of the subjects is missing. This link is essential, however, as there are subject-specific differences in the use of the tools which opens up further possibilities for use. Fourth, it means to encourage teachers and students to critically reflect on the fact that the main advantage of digital tools does not always include making teaching more efficient and quick. Fifth, it means to motivate, support and encourage teachers to use digital devices.

The Teaching-Learning-Lab offers — after a few small teething troubles — a wide range of services that can be used by students, teachers and schools. One goal is now to familiarize students and teachers with the available materials. They should get an impression of the benefits and value that can be created by using the materials. The main task of the Teaching-Learning-Lab will be to create technical and digital framework conditions that enable people with different levels of previous knowledge to use digital media in the best possible way. There will also be an increased focus on assistance in preparation, implementation and subsequent reflection in working with digital media. Consequently, the Teaching-Learning-Lab will offer a wide range of support to draw even more attention to the diverse range of digital media. The goal is to reduce the additional effort in the preparation and implementation of teaching units with digital media and to optimize the resulting value in learning outcomes.

4. Conclusion

To conclude, after about two years of Teaching-Learning-Lab at the University of Klagenfurt, it can be said that despite initial difficulties and enormous efforts to inform teachers and students about the offer, the work is now beginning to bear fruit. The technical obstacles, especially in the work with the tablets, are being overcome. The number of users of the premises is constantly rising. Additionally, the offers are being adapted to suit the needs. As said at the beginning, it is important to convince teachers of benefit of digital media and their benefit (especially in language learning) in order to be able to offer students a wide range of methods. However, some offers and teaching-learning workshops remain unexploited. For example, there is room for improvement in the use of technical conditions of class observation in the premises. Here, it is conceivable to analyse one's own teaching sequences with the help of the recording in order to subsequently adapt one's own pedagogical and didactic behaviour. Nevertheless, students began to spread the news on the campus about materials and the possibility to borrow these for different purposes. Additionally, the teachers have started to include tablets in their lessons. Students and teachers alike evaluate online tools as well as applications for their classrooms.

In future, the Teaching-Learning-Lab, its technical equipment and especially digital tools and applications may face even more interest and usage due to the experienced importance of those tools during the lockdown and learning in an online environment in the COVID-19 crisis in spring 2020. Even more, the crisis showed the importance of an adaptation of humans in the educational system to digital environments and the combination of analogue and digital material.

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