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Inclusive Digital Education – Changing Self-Efficacy in Teacher-Training Courses

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Abstract

Digitalisation and inclusion are two key interdisciplinary topics in vocational education that are often addressed separately and aimed at finding common links and exploiting common synergies in the inclusive digital education approach. Satisfying these requirements in the classroom poses a major challenge for student teachers in their initial career phase. In the context of an intervention programme, a mixed-methods design is used to investigate the extent to which the self-efficacy of student teachers changes with regard to the integration of inclusive digital education. The results show that self-efficacy changes positively, a finding that can be attributed especially to the several weeks of involvement in the intervention programme, as well as the attitude resulting from the personal importance of inclusive digital education. The high demands on teaching associated with inclusive digital education and the partial lack of framework conditions at the student teachers' schools can be identified as challenges.

Keywords: Self-Efficacy; Inclusion; Digital Learning Technologies; Vocational Education

Introduction

Inclusive Digital Education as a Target Dimension for Teaching for All

With Goal 4 of the 2030 Agenda, Switzerland has undertaken to guarantee inclusive and equitable quality education and promote lifelong learning opportunities for all (FDFA, 2020). This goal is based on the UN Convention on the Rights of Persons with Disabilities, which was ratified in 2014, and centres on the concepts of participation and inclusion. Inclusion can be narrowly understood as a concept that focuses on people with disabilities. A broader understanding includes the individual needs of all people and takes their heterogeneity into account Rützel [1]. This broad understanding of inclusion appears to be expedient for basic vocational education. The "Vocational and Educational Training 2030" initiative describes digitalisation as a megatrend for future learning and therefore as an opportunity for lifelong learning (SERI, 2017, p. 8). However, digitalisation also leads to an increase in the demands placed on learners, which entails additional risks of exclusion Wüthrich [2]. Thus, not all learners have access to digital technologies or stable internet connections, differences also exist in digital skills, and barrier-free access is lacking. Digital technologies offer the potential for inclusion, for example language learning apps or a wide variety of options for access to learning. However, teachers at vocational schools currently make little use of assistive technologies in lesson design Schellenberg et al. [3]. The effectiveness of digital technology use and inclusive teaching depends to a large extent on the degree of teachers' self-efficacy Wächter & Gorges [4], SERI 2021). Studies also show that teachers face major challenges in the initial phase of their careers Rauseo et al. [5] ; Educa [6]. The European Agency for Special Needs and Inclusive Education (2022) has developed visions for inclusive digital education. They describe the interplay between inclusion and digital technologies with the aim of breaking down barriers and increasing participation at all levels of the education system. A key requirement is that inclusion and digitalisation should be viewed as interdependent and overarching topics that should include both the institutional and individual levels. So, it is not "only" a matter of implementing inclusive didactics with digital technologies, but rather of their "constantly reflected and balanced use" in order to avoid setting up additional barriers to learning Mertens et al. [7]. Approaches to inclusive digital education currently have few points of contact in vocational education, although there is a high degree of connectivity with digitalisation and inclusion Sonnenschein [8].

Current research on self-efficacy and problem formulation

Self-efficacy refers to the confidence in one's own ability to master a certain situation Fritz & Tobinski [9]. According to Lipowsky et al. [10], a high level of self-efficacy is associated with an optimistic attitude, perseverance and willingness to make an effort, as well as a high degree of goal commitment and activity, while a low level of self-efficacy is associated with higher anxiety and lower self-esteem. Self-efficacy is expressed in beliefs and expectations of being successful in overcoming problems Lipowsky et al. [10]. Thus, a high level of self-efficacy is also associated with teachers' job-related beliefs Leuchter et al. [11]. Bandura [12] argued that the construct is changeable, particularly at the start of experiential processes, becomes more stable over time through cumulative experiences, and also has an impact on self-efficacy in similar challenging situations through generalisation effects. It has since been empirically confirmed that self-efficacy beliefs in the context of the teaching profession can be changed over both shorter and longer periods Bach [13]. The studies on the development of self-efficacy in student teachers show both increases and decreases, depending on the study phase and practical experiences Bach [13]. Quantitative methods in the form of questionnaires, prioritising the various facets of classroom teaching, are usually used in longitudinal studies to record self-efficacy. Qualitative methods are used less in the research discourse Bach [13] and tend to be used, for example, in the form of group discussions Onafowora [14].

Findings on the change in self-efficacy in relation to inclusion and digitalisation are available, but the interlinking of inclusive and digital education is a research desideratum Hartung et al [15]. The self-efficacy of teachers plays a crucial role in the implementation of digital technologies and inclusive didactics Wächter & Gorges [4]; (Seri 2021, p. 144). As regards the use of digital technologies in the classroom, it can also be stated that teachers face major challenges in the integration of digital technologies, particularly at the start of a career Rauseo et al. [5]; (Seri 2021, p. 144). This trend is also apparent in the implementation of inclusive digital teaching as a challenge for teachers at the start of their career Böttinger & Schulz [16]. In light of the above, this study aims to answer the following question: Can the self-efficacy of student teachers in relation to inclusive digital teaching be positively influenced by a targeted intervention, and is this reflected in the design of lesson planning?

Methodological Approach

The study is based on an intervention programme with a mixed-methods approach. The research design is illustrated in Figure 1. The study was conducted with student teachers (teaching in basic vocational education) in the first year of their course. The students attend one study day per week, supplemented by one day of self-study. The course lasts a total of two years and is worth 60 ECTS credits. All students were already teaching in schools during the course and had between two and ten years of teaching experience. The students were given a test in the introductory course module, which involved eight study days. For the module test, the students drew up a written lesson plan. On the first day, a questionnaire survey (pre-test) was conducted on self-efficacy with regard to the implementation of inclusive digital education in the classroom. This was followed on study days three to eight by an input of around 20 minutes on quality attributes of inclusive digital education in the classroom, each of which culminated in a specific practical task. On the last study day, a group discussion was held in two groups, and the questionnaire was repeated (post-test). The written lesson plan was also handed in. The individual instruments are briefly outlined below.

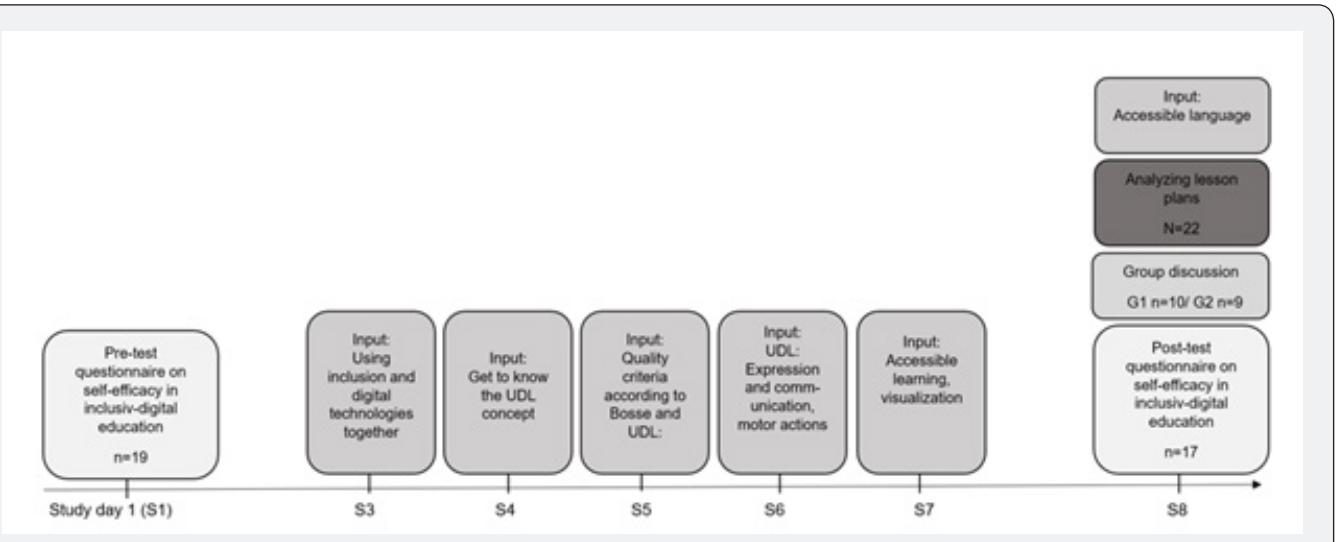

Figure 1: Research design.

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The questionnaire (pre- and post-test) was based on facets of the two questionnaire instruments SWIT - Self-efficacy of teachers with regard to the integration of digital technologies in teaching Doll & Meyer [17] and the SACIE-R/TEIP revised scale for Sentiments, Attitudes and Concerns about Inclusive Education/ Teacher Efficacy for Inclusive Practices Feyerer et al. [18]. The scales for Technical Knowledge, Digital Teaching (new: Inclusive Digital Teaching) and Learning-Related Knowledge were used from the SWIT instrument, while the two scales for Sentiment and Attitude were taken from the SACIE-R/TEIP instrument. All five scales were supplemented by indicators of inclusive digital teaching CAST [19]; Schaumburg [20]; Bosse [21]; Böttinger & Schulz [22], each expanded to five items, so that the newly developed instrument consisted of five scales with a total of 25 items. Psychometric data was also collected. The questionnaire instrument comprised a 6-point Likert scale (strongly disagree - strongly agree). The pretest with one study group (N=26) showed very good consistency (0.935). Since two items were deleted due to unclear content, the instrument ultimately comprised 23 items. On the last day of the study (post-test), the identical survey was repeated (n=19).

On the last study day, a group discussion based on Kühn and Koschel [23] was held in two groups (group 1: n=9/group 2: n=10) in order to record the subjectively experienced impact of the intervention programme as well as the opportunities and challenges of inclusive digital education. Due to the general conditions prevailing on the study day, the group discussions were modified, resulting in a time limit of 35 minutes and five key questions. The sample was a "real-life group" Przyborsky & Wohlrab-Sahr [24], and the research interest focused on the joint discussion of the integration of inclusive digital education in the classroom. A preparatory homework assignment served as a "warm-up", in which the students formulated their own definitions of inclusive digital education and presented them to each other. The inputs of the intervention programme of the respective study day were also visualised as a stimulus Kühn and Koschel [23]. The two group discussions were analysed deductively and inductively using qualitative content analysis according to Mayring [25]. Kühn and Koschel's analysis process was followed, and the results of the two group discussions were correlated in the "organising and sorting" step (2018, p. 207) in order to achieve as open a focus as possible. Finally, the lesson plans were analysed deductively and inductively with regard to the quality attributes discussed in the module using qualitative content analysis according to Mayring [25]. After submitting their lesson plans on the last study day, the students were asked whether the plans could be analysed accordingly, and all gave their consent (N=22). This helped avoid any distortion of the results arising from the requirement to record the implementation of the inputs in the lesson planning.

Results

The results of the pre- and post-tests point in the desired direction with regard to the mean values and are shown in Table 1. A notable result is that the students rated themselves highly overall, often with scores above four. The two scales on knowledge (learning-related and subject-related) tended to be rated as more demanding compared to the other scales, which may indicate just how important it is to provide appropriate support and guidance during the course. The high mean scores for the inclusive digital teaching scale are surprising, indicating that the surveyed students report having a corresponding repertoire of inclusive digital skills in the classroom. A t-test for two-way comparisons showed that the differences between the use in the pre-test and post-test were not statistically significant in all cases (Table 1). Whether a survey with a small number of cases (n=14) appears meaningful is a possible criticism. Furthermore, not all students took part in the survey. A positive factor is the statistical reliability of the pre- and post-tests.

Table 1: T-test by scale and mean values pre-test and post-test.

Skala	T	df	p	PreT α	PostT α	Pre M	Post M
Attitude	-1.061	13	0.308	0.76	0.9	4.38	4.7
Setting	-1.459	13	0.168	0.84	0.85	4.41	4.81
Learning-related knowledge	-0.446	13	0.663	0.83	0.88	3.95	4.11
Technical knowledge	-0.177	13	0.862	0.8	0.81	3.76	3.84
Inclusiv-digital teaching	-1.129	13	0.279	0.73	0.83	4.12	4.48

The results of the two group discussions are presented on the continuum from agreement to disagreement and are summarised with the key statements. Agreement means that the teachers seek to implement inclusive digital education and, in particular, see the importance of this for their own lessons. The measures mentioned in this context include aids, a variety of visualisations and more collaborative teaching. In this context, disagreement is not shown with regard to the usefulness of inclusive digital teaching, but rather personal limitations are recognised (e.g. lack of time for planning and lesson preparation). It could also be stated that approaches to inclusive digital teaching are too complex in the current professional situation. There is also agreement on this in the form of additional motivation to explicitly integrate inclusive digital education as an element in lessons.

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Agreement is also apparent concerning the fact that some students teach at schools that give them a lot of freedom as regards inclusive digital education and its implementation. On the other hand, there are reports of schools that impose restrictive requirements or make accessible learning impossible for pupils (e.g. a barrage of passwords, specified learning apps). The results therefore highlight aspects that can either promote (agreement) or hinder (disagreement) self-efficacy among students. The lesson plans show that the intervention programme has clearly left its mark on the students. Overall, most students have introduced at least one principle of the intervention programme (19/22). One positive outcome is that three students found the courage to include digital technologies in their lessons for the first time. The variety of measures identified in the lesson plans (e.g. collaborative learning, simple language), leads to the conclusion that the students consider inclusive digital education to be important and that they have a corresponding attitude and sentiment. However, the extent to which the self-efficacy of individual student teachers has changed cannot be conclusively ascertained.

Discussion

The questionnaire survey shows no significant change in self-efficacy (Table 1). It should be noted that the results show high mean values overall and that the students therefore tend to report a high level of self-efficacy. This may seem surprising, since the students only have a few years of teaching experience, and the initial career phase is explicitly described as challenging in the literature e.g. Böttinger & Schulz [16]. The students were able to incorporate measures towards inclusive digital education in their lesson plans. In this respect, the fact that three students used digital technologies in their lessons for the first time as a result of the intervention programme can be described as a positive outcome. The chosen duration of eight weeks at the start of the course also proved to be appropriate, even if it was not possible to implement the programme equally for all students. In this context, it seems important to be aware that the teaching experiences of the students differ. The expectation should therefore not be to demand corresponding implementation measures, but rather to guide the students on their way and thus strengthen their self-efficacy. The results of the questionnaire survey can therefore be related to the generally high level of self-efficacy with lesson planning, which also indicates a willingness to implement inclusive digital education [26-28].

Agreement or disagreement, and thus a high or low level of self-efficacy of the students, is a key result of this study, and schools have to face different structural challenges, which could be a possible explanation for the low level of self-efficacy. It seems expedient for schools to be aware of the requirements of the two interdisciplinary topics of inclusion and digitalisation or inclusive digital education and to develop corresponding framework conditions. References to inclusive digital education should always be addressed in the curriculum in order to strive for continuous further development and positively influence self-efficacy Bach [13]. A limitation of this study is the fact that not all student teachers were present for the questionnaire survey (pre- and post-test) or the group discussion. As a result, the sample tends to be small but, as described above, it does highlight significant aspects. It should also be noted that only some facets of self-efficacy were highlighted with the selected content. Additional facets would be useful here (e.g. motivation). A long-term integration of inclusive digital education in the curricula of teaching courses can be recommended as a research desideratum in order to promote the development of self-efficacy and strengthen the engagement with this approach in the long term. A mixed-methods design was used in the study in order to investigate whether the self-efficacy of student teachers in relation to inclusive digital teaching can be positively influenced by a targeted intervention, and whether this is reflected in the design of lesson planning. The intervention programme appears to be expedient in encouraging students to implement the programme, while at the same time involving the learning group as a whole and exchanging information about conditions for success and challenges. At least some of the student teachers were able to raise their level of self-efficacy by having the courage to engage with this issue. This was particularly apparent in lesson planning [29-31].

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