Preservice Teachers' Online Self-Regulated Learning

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Teaching in today's schools asks teachers to foster self-regulated learning and digital competences in children and young people. In order to do so, teachers first need to acquire and use these competences themselves.

self-regulated learning online learning preservice teachers

1. Digital Readiness and Digital Competences of Preservice Teachers

Undoubtedly, today's formal education—including K-12 and higher education—relies on the competent integration of educational technology, both as a means to deliver content (e.g., [1]) and as a result of its teaching and learning efforts (e.g., [2]). In this context, interrelated concepts such as digital competence, digital literacy, or digital skills are of growing importance [3]. They encompass skills related to information retrieval and understanding, to instrumental use of technology, digital content creation, and communication via digital technology and platforms [3].

Teacher education is not exempt from this development. On the contrary, the "European Framework for the Digital Competence of Educators" addresses educators as a group with the necessity to be digitally competent in order to engage professionally, to teach, assess learning, and navigate increasingly digital learning environments in education institutions [4]. Still, Senkbeil and colleagues [5] indicated in the German context that preservice teachers in their sample lacked sufficient ICT competences. Prestridge [6] states that for inservice teachers, "a relationship between ICT competence, confidence and practice" (p. 457) is emerging. In accordance, it is essential that preservice teachers develop ICT skills in order to support their school students in online learning [7]. However, Cabezas-González, Casillas-Martín, and García-Peñalvo [8] showed, for their Spanish student sample, that personal variables such as gender and age are related to the degree of digital competence as well. Besides, it is not the mere instrumental mastering of digital tools that preservice teacher education is asked to foster. It rather entails also considering the nexus of pedagogy and technology, and in doing so, supporting the notion of how preservice teachers are enabled to professionally develop along this line, e.g., through skills in design thinking [9].

The evaluation of two classes for preservice teachers that made use of the flipped learning approach indicated that authentic situations, in which the preservice teachers could implement educational technology and receive feedback as well, and the integration of technology into the higher education course, is conducive to fostering competences at the junction of content, pedagogy, and technology [7]. Using the example of Korean preservice

teachers, Lee and Lee [10] showed that their perceived self-efficacy for technology integration increased after attending a course on educational technology following a blend of theory and practice, aligned with the national school curriculum, and including concrete lesson planning. The latter proved to also be the deciding factor for the increase in perceived self-efficacy. These studies show that pedagogical design is influential in regards to fostering preservice teachers' digital competence and pedagogical views.

Additionally, in a systematic study of qualitative studies on preservice teachers' preparation to use educational technology, Tondeur and colleagues [11] discussed central topics that pertain to teacher education but also to the institution—showing that teacher education is a multilayered field.

2. Self-Regulated Learning

Self-regulated learning seems to be particularly important for learning and teaching in online environments, allowing more freedom with regard to time and space and with different types of communication and collaboration [12]. Hence, self-regulated learning plays a central role for successful learning in traditional, but especially in online, learning settings. A student who is able to learn in a self-regulated way "(…) is able to set task-related, reasonable goals, take responsibility for his or her learning, and maintain motivation. It is also assumed that self-regulated learners are able to use a variety of cognitive and metacognitive strategies. These students are able to vary their strategies to accomplish academic tasks" [13] (p. 101). Self-regulated learning is described in different models, each focusing on distinct aspects, such as cyclical aspects of processes models [14], different components of self-regulated learning [15], motivational aspects [16][17], or metacognitive aspects [18][19].

3. (Online) Learning Strategies: Types and Requirements

Learning strategies are a core concept of the theoretical conceptualizations of self-regulated learning [20]. Weinstein and colleagues [20] define learning strategies by "any thoughts, behaviors, beliefs, or emotions that facilitate the acquisition, understanding, or later transfer of new knowledge and skills" (p. 727). Metacognitive strategies encompass three types of strategies: planning, monitoring, and regulation [21]. Resource management strategies aim to manage and control the learning environment. This includes external resources such as time, study environment, and other people (seeking help from peers or lecturers) but also the regulation of internal resources such as attention or effort [21][22].

The importance of self-regulated learning and learning strategies is given by its relation with performance and learning success (see [12][23][24]). That is, students with higher use of self-regulated learning strategies show higher performance. Vice versa, students' prior knowledge is correlated with their use of learning strategies [25][26][27].

4. Self-Regulated Learning and Digital Readiness

Studying in higher education is characterized by relatively limited degree of external control and structure, requiring students to responsibly steer and regulate their learning processes (e.g., [13]).

Because of the increased use of online and computer-based learning in higher education, self-regulation gains additional importance [12][28], as do questions related to support measures for self-regulated learning [29]. Generally speaking, learning in (online) distance education relies on the prerequisite of certain abilities in self-regulation on behalf of the learner (e.g., [30][31]). However, Foerst and colleagues [32] showed that knowledge about self-regulation strategies does not necessarily translate into respective study behavior.

The case is specific for preservice teachers, who need to be knowledgeable about their self-regulation in order to perceive it as part of their professional identity to be able to subsequently support their students in school [33][34]. For example, in a mixed-method study with high school students, it was found that those who felt more competent to self-regulate their learning procrastinated less and coped better with the specific challenges with regard to online learning [35]. Up to now, preservice teachers have been subject to investigation of their self-regulated learning (e.g., [36]), their self-regulated learning in relation to technological pedagogical content knowledge (e.g., [37]), as well as their behavior and experience when learning with authentic cases or learning with wikis integrated into the instruction of higher education courses [38][39].

In the specific situation of the COVID-19 pandemic, the need for self-regulated learning might even have grown. The possibilities to reach and use external resources (public library spaces) have changed significantly. As stated by Hensley and colleagues [40], "productive study locations and routines students had established were lost and difficult to re-create" (p. 210). In addition, social distancing [41] resulted in fewer opportunities to create one's own learning environment [42] and limited opportunities to interact and seek help from peers and lectures [43][44]. Hensley and colleagues [40] reported that students partly perceived themselves to feel more in charge of their learning, but in general voiced "their inability to access on-campus resources, work in peer study groups, or attend review sessions and office hours" (p. 211), which the students felt as a burden. Thus, due to the pandemic, learning spaces and thereby learning processes have changed, with important consequences for self-regulated learning. Berger and colleagues [45] concluded that competences for self-regulated learning play an essential role in the pandemic situation and found that secondary school students with lower prior knowledge and low motivation had more difficulties coping with the situation.

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