Pedagogical Digital Competence—Between Values, Knowledge and Skills

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Abstract

The fact that the education provided by universities and university colleges is becoming ever more digitalized has resulted in new challenges for university teachers in providing high-quality teaching and adapting to the needs of changing student populations. Digitalization has increasingly introduced a new dimension in teachers' pedagogical skills and competences which we have chosen to call Pedagogical Digital Competence (PDC). The purpose of this paper is to discuss and define this new dimension, based on literature and concepts from neighboring areas. As our purpose is to define a concept, the discussion is of a theoretical nature and does not include a comprehensive literature survey. The discussion results in the following definition of PDC: "Pedagogical Digital Competence refers to the ability to consistently apply the attitudes, knowledge and skills required to plan and conduct, and to evaluate and revise on an ongoing basis, ICT-supported teaching, based on theory, current research and proven experience with a view to supporting students' learning in the best possible way". Pedagogical Digital Competence thus relates to knowledge, skills and attitudes, and to technology, learning theory, subject, context and learning, and the relationships between these. PDC is thus a competence that is likely to develop the more experienced a teacher becomes.

Keywords: higher education, digitalization, Pedagogical Digital Competence

1. Introduction

The education provided by universities and university colleges is becoming increasingly digitalized. MOOCs are being discussed at most higher education institutions in Sweden, as in many other countries, and some have already implemented such courses, an increasingly great part of the teaching is carried on online and the number of students on online courses is constantly growing (Söderström, From, Lövqvist, & Törnquist, 2012). There are also some relevant differences between student groups. For example, rather than enroll on a program, online students primarily choose to take standalone courses, often with a view to general competence development or continuing professional development while maintaining their current jobs. Another difference is that those taking online courses tend to be older students, a majority of whom are women with children living at home (Mahieu & Wolming, 2012).

Digitalization thus entails new challenges for university teachers in providing high-quality instruction (Horizon Report, 2015), especially in view of changing student populations, and has increasingly introduced a new dimension in teachers' pedagogical skills and competences which we have chosen to call Pedagogical Digital Competence (PDC). So what does this new dimension include and entail?

2. Purpose—To Discuss and Define

The purpose of this paper is to discuss and define the concept of Pedagogical Digital Competence, based on literature treating neighboring areas and concepts. Since definitions are by nature theoretical, so is our discussion, and the author make no claim to have performed a complete literature survey. Instead, we aim to define the concept of PDC with a view to enabling further analysis, empirical studies and development work in this area.

3. Starting Points—Pedagogical, Digital and Competence

So what is PDC? A rough interpretation might be "teachers' ability to use ICT in their teaching practice". However, a more precise meaning can be arrived at by examining separately the different parts that make up the concept. What is meant by "competence", by "digital" and by "pedagogical"? After a discussion of these constituents, we will return to the PDC concept as a whole.

3.1 What Is Meant by "Competence"?

"Competence" is defined in SAOL as "adequate skill, capability; authority" (p. 453). The Oxford Dictionary of Psychology (2001) provides a more complex definition: "The capacity, skill, or ability to do something correctly or efficiently, or the scope of a person's or a group's ability or knowledge" (p. 149). However, the term has given rise to a variety of slightly different ideas, a number of which are discussed by education technologist Westera (2001) in an attempt to find out how the concept is used in educational contexts. What these different uses have in common is their focus on prerequisites for performance. Westera argues that this performance takes place in complex environments and that competence should not be seen as being essentially different from skills.

The implications of Westera's reasoning are, for example, that competence is something that can be developed and that it is tied to a professional context, but that the predictive value is difficult to assess since the contexts are complex and values are involved. Westera ends his argumentation by stating that "…when all is said and done, the only determinants of human abilities are possessing (knowledge), feeling (attitudes), and doing (skills)!" (p. 87).

3.2 What Is Meant by "Digital Competence"?

"The term digital competence" appeared in the European discussion as early as 2000, when prerequisites for life-long learning started to be formulated, and the term was spread further when it was introduced as one of the eight key competences in the EU recommendations of 2006 (Käck & Männikkö Barbutiu, p. 16).

A rough definition of the concept of Digital Competence (DC) would be that it refers to the ability to use ICT. Like the concept of competence, the meaning, depth and breadth of the concept vary between authors (Ilomäki et al., 2011; Krumsvik, 2011, 2012; Käck & Männikkö Barbutiu, 2012). Krumsvik notes that it is not clear "whether the underlying epistemology within education is steered by policy makers or by academics" (2011, s. 40).

Some see the term DC as a plural, i.e., digital competences, which include, for example, the ability to use a specific digital technology or software, e.g., MS Word, or types of digital tools such as word processors. Much of the literature deals with "basic Information and Communication Technology (ICT) skills or some special sub-skills" (Lakkala et al., 2011, p. 1). Others, who adhere to a slightly more general definition of the term, talk about competence areas, for example Sabaliauskas et al. (2006), who lists areas such as basic ICT competence, ICT-policy competence, ethical use of ICT competence, integration of ICT in teaching competence and didactic methods with ICT competence. Drawing demarcation lines between the DC concept and other, similar concepts such as ICT-skills, e-competence, standards, etc. is not a straightforward task, and in the literature, references are often made to different conceptualizations. This might be due to the fact that DC is "more or less a political concept" (Ilomäki et al., 2011, s. 1) that reflects perceptions of current and future needs for a region's "economical competition" (ibid.), in which ICT is a key issue. At present, the concept has no general scientific basis.

3.3 A Swedish Perspective

In an anthology entitled "Digital kompetens i lärarutbildningen" (Digital Competence in Teacher Education) (Käck & Männikkö Barbutiu, 2012), the authors discuss, among other things, the concept of digital competence. They argue generally that it "includes knowledge, skills and attitudes" (p. 16) and that it involves "an open, curious and, most importantly, holistic attitude to IT, rather than the ability to use certain digital technologies" (p. 19). The knowledge referred to includes "the use and application of different software and applications", the ability to "identify opportunities as well as risks" and "legal and ethical principles" (p. 16). Skills comprise "the ability to seek, gather and process information critically and systematically…, assess its relevance…produce, report and understand…" (p. 16). Attitudes, then, seem to include critical thinking, creativity and innovation (p. 16). Digital competence seen from this perspective comprises digital didactic competence, digital technological competence and digital theoretical competence (p. 19).

Digital didactic competence refers to the ability to "assess when, where, why and how IT should be used for pedagogical and methodological learning support to enable selection of work methods and digital tools that best

suit a particular content, environment and context. Reflections on the didactic perspective are necessary in order to reach higher and deeper levels of learning" (p. 19).

Digital technological competence includes "... using IT and keeping oneself updated in order to be able to deal with processes and implementations in the areas of learning, information, communication and administration. From a technological perspective, digital competence is about being able to use IT and having the confidence to use it as a tool in one's teaching practice" (p. 21).

Digital theoretical competence finally, "… requires an awareness of the relationship between IT and theory in order to achieve a deeper understanding of IT and the opportunities it offers" (p. 21).

3.4 A Norwegian Perspective

In Norway, relevant contributions in the area of digital competence have been made by Krumsvik (2011, 2012). Krumsvik, who is engaged in "empirical testing of a theoretical model of digital competence" (UIB, 2013), has studied the spread of the concept in Norwegian educational policy and argues for the need of a conceptualization that can bridge the gap between micro and macro perspectives on digital competence (2011, 2012). In Norway the concept has the status of the fifth basic skill in the compulsory school system and in teacher education, in line with EU recommendations.

Krumsvik objects to this fifth basic skill being described as "the ability to use digital tools" (p. 42). He argues that while the term "digital literacy" is used internationally, "digital competence" is the preferred term in Scandinavia as it is felt to have a somewhat broader and more holistic meaning where "focus is directed towards pedagogy and subject matter, while technical skills form only a basic part of this complex concept of digital competence" (2011, s. 44). Attempting to leave the macro-plane and focus more specifically on teachers' digital competence, Krumsvik suggests the following definition:

"Digital competence is the teacher/TEs' proficiency in using ICT in a professional context with good pedagogic-didactic judgement and his or her awareness of its implications for learning strategies and the digital Bildung of pupils and students" (2011, s. 45).

Krumsvik is of the opinion that the digital competence of teachers/teacher educators is different from that of other technology users and that it includes "… the intersection between cognition, metacognition, motor skills, learning strategies, self-efficacy and pedagogic-didactic aspects" (2011, s. 46). He then goes on to discuss a model of teachers' digital competence (Figure 1 below).
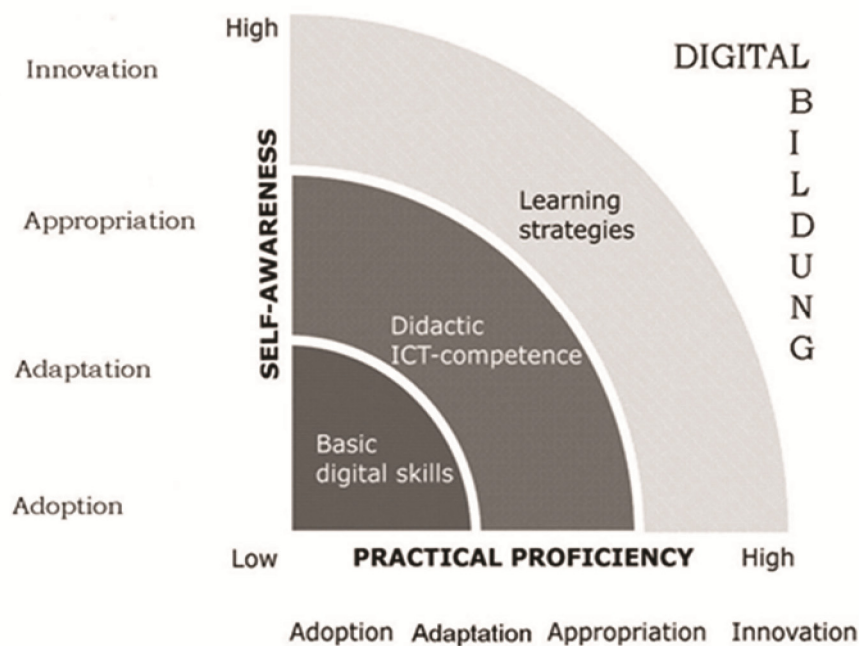

Figure 1. A model of teachers'/teacher educators' digital competence (2012, p. 6)

In Krumsvik's model, teachers' digital competence involves four different core components which to a significant degree build on one another. They include basic (but not necessarily simple) ICT skills, didactic ICT competence, assessment of implications of teaching strategies and a broader understanding of ethics, source criticism and identity development in a society that is being digitalized:

1) In order for teachers to achieve "Basic ICT skills", the technology must be more or less "transparent".

2) "Didactic ICT competence" refers to the ability to use ICT in subjects in order to achieve competence-based aims.

3) The "Learning strategies" component assumes a meta-perspective of the first two components and focuses on pedagogical implications of a changing view of knowledge.

4) The component entitled "Digital Bildung" assumes a meta-perspective of the first three components and focuses on how pupils' participation and identity development are affected by the digitalization of society, ethical reflections on the role of technology in human development and the ability to critically assess sources of information.

The development of this digital competence takes place in the course of a journey along two lines, practical knowledge on the one hand and self-reflection on the other. The journey goes through four stages: adoption, adaptation, appropriation and innovation. In the first two stages, the focus in on the technology and teachers are "mostly occupied with basic ICT skills" (2012, s. 47). When teachers reach the appropriation stage, the technology becomes "seamlessly integrated" (ibid.) into their teaching practice and having attained the last stage, innovation, they are able to develop pedagogical and didactic innovations using ICT and redesign and develop digital artefacts. Krumsvik believes that the main challenge now is teachers' lack of digital competence and that in order to meet this challenge, a new framework for professional development must be established.

4. What Is Pedagogical Competence?

Like the concepts discussed above, pedagogical competence also involves the political arena, and there is no theoretical definition in the literature (e.g., Ryegard et al., 2010; Liakopoulou, 2011; Vioral, 2013). However, different authors often use similar elements in their argumentation (ibid.). Nursing researcher Anna Vioral stresses concepts such as knowledge, skills, experiences, ability, aptitude, attitudes (s. 37) and defines pedagogical competence as:

"...the ability to perform in the nursing academic context (online education) by applying the knowledge, skills, and experience of the pedagogical principles in curriculum development, instructional strategies, use of instructional technology, and evaluation techniques as outlined in the National League of Nursing (NLN) Nurse Educator Core Competencies" (Vioral, 2013, s. 37).

While Liakopoulou (2011) argues that teachers' "…complex and ever-changing role does not allow for a clear-cut definition…" (s. 474), she still tries to get to grips with the concept. She talks about it in terms of knowledge about students, teaching methodology, curricula and the knowledge of "self", both generally in connection with pedagogy and more specifically with regard to pedagogy in relation to the subject (p. 475). She also uses the term "amplitude" which includes a) professional and developable personality traits, b) pedagogical and teaching skills bridging the gap between theoretical principles and practical circumstances, thus making it possible to identify different possible strategies, c) a "specialized body of knowledge" (p. 475) supporting the practice, and d) attitudes and views towards teaching and learning which influence selection, evaluation and use of knowledge.

On a more theoretical level, Maclellan (2008) discusses pedagogical competence using the term "pedagogical literacy" and argues that it is essential that teachers develop both their knowledge and skills in order to be able to adapt to different situations, and that writing and documentation is a suitable method to support their professional development.

4.1 A Swedish Perspective

In 2010, researchers from a number of Swedish universities produced an authoritative report on pedagogical competence ("pedagogical skill" in the Swedish version) funded by the Swedish National Agency for Networking and Cooperation in Higher Education (NSHU) (Ryegard et al., 2010). The authors point to the fact that the concept "often lacks a definition" (p. 3), but that it is about "supporting students' learning in the best possible way" (p. 10). The meaning of the concept has evolved "from teaching skill towards a more comprehensive definition of pedagogical skill" (p. 11) and teachers today are expected to have a more "scientific

approach to their work" (p. 11). To acquire such an approach, teachers must have "a common language and a scientific basis" enabling them to achieve development in teaching and learning in higher education (p. 11). Education must "have a scientific basis" as regards both content and form (p. 13). The authors argue that "the core of the concept can be described as having three basic components" (p. 12), and that assessment of pedagogical competence should:

- be based on actions that support students' learning

- include teachers' ability to develop their practice and share it with others

- allow for a description of a threshold value (a minimum level) and the progression in a teacher's pedagogical skills (p. 12).

It is also stated that the duties of a teacher include examining their own teaching practice, sharing their knowledge and continuously striving for professional development, and that self-reflection is an important element when it comes to achieving this (pp. 13-14).

In the report, representatives of some Swedish higher education institutions contribute their own definitions of pedagogical competence:

Uppsala University—"Pedagogical skill can be described as the ability and willingness among teachers to consistently apply those attitudes, knowledge and skills that promote their students' learning in the best possible way, in accordance with set goals and within the limits provided. This calls for continuous development of teachers' own competence and the design of the teaching" (s. 12; Giertz, 2003, s. 94).

Mälardalen University College—"Pedagogical skill means that teachers, on the basis of set goals and limits, through continuous development of their teaching and their own competence, support and facilitate their students' learning in the best possible way. A teacher's pedagogical skill also reflects his or her competence with regard to collaboration, holistic approach to learning and contributions to the development of teaching and learning in higher education" (s. 12; Ryegard, 2008, s. 9).

Lund University—According to the representatives of Lund University, pedagogical skill requires 1) a focus on students' learning, 2) a manifest progression over time, and 3) a reflecting (researching) approach (pp. 118-119). Their assessments of teachers' pedagogical skill are made along two axes, viz. the sophistication of a teacher's theoretical pedagogical reasoning, and the sophistication of his or her pedagogical practice.

5. Pedagogical Digital Competence (PDC)

Against the background of the above excursions into the fields of competence, digital competence and pedagogical competence, we will now return to the concept of pedagogical digital competence, in a general as well as a specific sense.

Initially, we talked about the changing context of universities and university teachers, which in turn is a reflection of a general development in society in which ICT has come to play an increasingly important role and as a result of which ICT-supported distance education now accounts for a substantial proportion of higher education. This development is not just a national phenomenon; its global generality has been commendably described by, for example, Laurillard (2007), who argues that current pedagogical issues can be solved through the use of ICT, provided that the issues are allowed to dictate the use of the technology and not the other way around. According to Schneckenberg (2009), this will call for an upward revaluation of universities' pedagogical practices vis-à-vis their research practices.

Thus, a main characteristic of PDC is the ability to develop/improve pedagogical work by means of digital technology in a professional context, primarily in web course/online teaching. In a wider sense, however, PDC involves all kinds of pedagogical work in professional contexts where digital technology is used. In addition, PDC can be said to comprise (at least) three levels, and their internal relationship, viz. a micro-level (interaction level) which involves the pedagogical interaction with students (c.f., Krumsviks digital competence), a meso-level (course level) involving design and implementation of courses, and the infra-structure of education (for instance integration of resources like the library or educational guidance) and a macro-level (organizational level) focused on educational management and the development of the organization. Thus, strategic pedagogical leadership is a central component of PDC on all three levels.

PDC comprises both practical knowledge and conceptual knowledge, also in more epistemological respects, which means that it is not a competence one is born with but something everyone can develop. The yardstick by which PDC is assessed is always the extent to which students'/participants' learning is enhanced. PDC can therefore be defined in different ways depending on methodological choices of theories of learning, but it is

always something that finds expression in concrete action. This means that PDC can always be evaluated, documented and developed regardless of the theory applied, and, in principle, a developed PDC always results in better support for students'/participant's learning. However, as PDC is always expressed in concrete action in complex professional contexts, it is not possible to establish a direct predictive value.

Based on the above discussion, PDC can be defined as follows:

"The concept of pedagogical digital competence refers to the ability to consistently apply the attitudes, knowledge and skills required to plan and conduct, and to evaluate and revise on an ongoing basis, ICT-supported teaching, based on theory, current research and proven experience with a view to supporting students' learning in the best possible way".

6. Some Final Reflections

Pedagogical digital competence relates to knowledge, skills, attitudes and approaches in relation to digital technology, learning theory, subject, context, and the relationships between these. PDC is thus something that can be expected to develop the more experienced a teacher becomes.

University teachers have great influence over their students' learning contexts, i.e., the contexts that guide the students in their study of a particular subject. Teachers in higher education can in various ways impact and leave their mark on courses they teach or coordinate. In particular, they can influence the way in which their courses are run, i.e., the support made available to the students on their journey towards reaching the course goals and expected learning outcomes, such as lectures, seminars, laboratory work, quizzes etc. The choice of support thus reflects the teachers' attitudes to their students, the subject, learning, teaching tools etc. In addition to having an influence on how a course is conducted, teachers also have some say with regard to the content of their courses through discussions about course goals, course literature and expected learning outcomes.

The ability to design courses is directly related to knowledge. Theories about teaching and learning, knowledge of the various ways in which learning takes place and how learning can be enhanced can be used as course design tools. Concretely, it is about how resources can be mobilized or developed in order to support students' learning. In this process, a knowledge of such potential resources is essential. By knowing what resources are available, how they can be used and combined, and being aware of their pros and cons, informed choices can be made about course design, material, activities, feedback, etc.

In this connection, a knowledge of ICT-support is relevant and important. Are there digital technologies that might enhance the teaching and learning processes the students are involved in? Where students are expected to engage in collaborative learning, what kind of ICT support do they need and how can this be provided? What tools developed by others might be useful? Visualization tools such as Popplet? Peer writing tools like Google Docs? Communication tools, e.g., Skype or Adobe Connect? What new challenges might the students encounter when they are encouraged to use such tools? How can such new challenges be overcome? What experiences have others made? Thus, a knowledge of digital technologies can support the operationalization of pedagogical ideas in a given context.

However, ICT is not just a new arena for old pedagogical ideas. ICT has dramatically changed our society, the contexts that young people are fostered into, what is learnt and how it is taught. ICT has thus influenced pedagogical theories. It is probably no coincidence that pedagogical theories focused on digital tools have received so much attention in a time when high-tech tools impact everything, from everyday interactions to global relations. From a PDC perspective, it is relevant to keep up to date with new pedagogical theories targeting current challenges.

Education is a practical activity and teaching is art as much as science, in equal parts knowledge and skills. However, neither of these two components is sufficient on its own. In order to attain PDC it is not enough merely to understand concepts, be familiar with current research and to know what digital technologies are available. Skills are also needed, e.g., being able to use such technologies, meeting students where they are and giving them precisely the kind of support they need to progress. A person possessing PDC can support students in their journey towards achieving expected learning outcomes, understand how this process works and how it relates to regulating principles.

Attitudes expected of someone who has pedagogical digital competence, finally, include an attitude to his or her own teaching practice which over time leads to improved practical knowledge in the use of ICT for learning support, as well as an increasingly good conceptual understanding that will help to explain why something works or does not work in a given educational context.

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Note

Note 1. Some parts of earlier versions of this paper have previously been published in Swedish online, c.f. (http://www.epedagogik.eu/pdk-mellan-varden-vetande-och-kunnande/). All translation of quoyes from Swedish into English are ours

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