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TEACHERS' PEDAGOGICAL BELIEFS AND TECHNOLOGY INTEGRATION

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Abstract

Teachers' beliefs on teaching, learning, and evaluation represent one of the strongest predictors of the way in which technology is capitalized. Whenever we aim at the change of the practices regarding the use of technology for obtaining different learning outcomes, we must consider also the transformation of the beliefs that support and facilitate these practices. The present paper analyzes the relevant research regarding the relation between teachers' pedagogical beliefs and the use of educational technologies. The main aim is to identify key aspects and significant results concerning the impact that the beliefs on teaching, learning, and evaluation have on the way in which digital technologies are used in educational frameworks. The analysis revealed that pedagogical beliefs may support or obstruct the implementation of certain educational practices and also condition the profound changes occurring within these practices. In order to optimally take advantage of technology, it is important to subordinate it to some coherent teachers' beliefs attuned to the student and learning centered pedagogical paradigms.

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1. Introduction

The COVID – 19 pandemic has affected over 1.6 billion learners in more than 190 countries across the continents, being considered one of the greatest disturbances of educational systems in history (UN, 2020). Numerous educational institutions all over the world closed their gates, voluntarily or compulsorily, shifting to new ways of delivering the educational programs, very suggestively named in the specialist literature 'emergency remote teaching' (Hodges et al., 2020) or 'temporary online pivot' (Nordmann et al., 2020). Amid these changes the educational institutions are faced with unique challenges urging them to come up with a variety of possible solutions that could meet the new needs of learners and of the community (Hodges et al., 2020). Moreover, they focus on the necessity of seriously reconceptualizing the educational practices, mainly the strategies regarding the use of digital technologies in order to better adapt them to the new educational environments/ contexts.

2. Problem Statement

The study of teachers' pedagogical beliefs is important because substantial empirical support exists that teachers' conceptions of teaching, learning and assessment strongly influence their educational practices, how they teach, what students learn, how learning is evaluated, and how the digital technologies are used. Research in the field shows that one of the strongest predictors of how technology is used by teachers is actually teachers' deeply ingrained beliefs on teaching, learning, and evaluation (Ertmer et al., 2015). Pedagogical beliefs support and facilitate educational practices and also condition the changes occurring within these practices (Ertmer et al., 2015; Pozo et al.; 2021; Sang et al., 2010). We consider that, within an educational framework where digital technology becomes vital in supporting teaching and learning, it is legitimate to focus mainly on the major factors, namely teachers' beliefs that determine the way in which these technologies are capitalized. In this paper we aim to identify key aspects and results of the studies concerning the relation between teachers' beliefs on various educational artifacts (teaching, learning, evaluation) and the way in which they use and integrate digital technologies in their educational practice.

3. Research Question

The main research question of the present theoretical analysis regards the complex relation between teachers' beliefs and the way in which digital technologies are used in educational contexts. Teachers' beliefs are understood as part of a comprehensive multidimensional system that can include contrasting beliefs which can or cannot materialize in practice, dependent on individual or contextual factors (Opre, 2015). These beliefs may refer to the epistemology of the specific field, to the students, to the teacher's status, to the content and the way in which it must be taught and evaluated, as well as to a series of social aspects related to teaching. They develop gradually, over time, and through exposure to didactic experiences (Levin, 2015; Opre, 2015). Once stabilized, the teacher's beliefs on teaching, learning, and evaluation work as a grid of interpretation and transformation of curricular documents, affecting also their implementation (Opre, 2015). These beliefs influence one's decisions regarding their

preference for certain instruction or evaluation strategies, the selection of instruction resources and of educational technologies. Consequently, a genuine change regarding the educational practices is seriously conditioned by a transformation of the pedagogical beliefs that teachers hold on various dimensions of their didactic activity (teaching, learning, evaluation).

4. Purpose of the Study

In this paper we aim to identify key aspects and results of the studies concerning the relation between teachers' beliefs on various educational artifacts (teaching, learning, evaluation) and the way in which they use and integrate digital technologies in their educational practice.

5. Research Methods

The connection between beliefs and practice is, nonetheless, very complex and, not at all straight and simple as we might be tempted to think. In order to understand the complexity of this relation we review and integrate the main ideas from a series of studies that investigate the factors that might influence directly or indirectly the way in which beliefs materialize in educational practices.

6. Findings

Based on the relevant literature review, we can distinguish factors related to the teacher (knowledge, personal motivation), institutional factors (leadership, ICT policies implemented by the institution), as well as cultural and social factors (the existing academic culture) (Ertmer et al., 2015; Ertmer & Ottenbreit-Leftwich, 2010). As they are influenced by these factors, the two components (beliefs and practices) get mutually inter-conditioned (Opre, 2015): the beliefs may influence the way in which practices are implemented; in turn, the used practices may influence the development of certain beliefs or, on the contrary, teachers' beliefs may be sometimes inconsistent with the implemented practices.

Regarding the dynamic of the relation between beliefs and practices specific to the use of educational technology, which is also the topic of our paper, research in the field demonstrates a close connection between the use of technology and beliefs (Fives & Gill, 2014; Hofer & Pintrich, 1997, 2012; Ottenbreit-Leftwich et al., 2010; Pozo et al., 2006; Tondeur et al., 2007). Analyzing the specialist literature, we can identify two major categories of teachers' beliefs that seriously affect the way in which technology is used in teaching (Ertmer et al., 2015; Pozo et al., 2021). The traditional belief focuses on the reproductive aspect of learning, on teacher-centered activities, and on the contents. In contrast, constructivist beliefs focus on student-centered educational activities. Teachers who hold traditional beliefs usually make use of technology as an instrument of information, as a substitute for traditional means of providing knowledge (de Aldama & Pozo, 2016). They return to technology only to facilitate the dissemination of and access to information: presentation of a course, the search for information on the Internet, elaboration of contents, revision and consolidation of knowledge. In such instances, the use of technology brings no functional changes in teaching and learning, as students' level of engagement is low. Contrastively, teachers who hold constructivist beliefs integrate technology in teaching in order to facilitate authentic learning, to transform learning. They create learning situations oriented towards the

development of students' problem-solving and collaboration skills, learning situations where the student, not the teacher, uses technology to manage information. Technology is used as an instrument through which students face genuine learning situations, not as a means of providing knowledge. Therefore, different ways of using technology lead to different learning outcomes.

As various authors emphasize (Comi et al., 2017; Pozo et al., 2021; Tondeur et al., 2017), it is important to highlight that technology per se does not change teaching and learning, but rather the way teachers make use of it. The use of technology is, in its turn, influenced by teachers' beliefs on teaching and learning. Therefore, whenever we aim at the change of the practices regarding the use of technology for obtaining different learning outcomes, we must consider also the transformation of the beliefs that support and facilitate these practices (Chai et al., 2009; Opre, 2015; Sang et al., 2010). Having a supportive academic culture (Tondeur et al., 2009) and initiating some professional development plans are factors that can facilitate this pedagogical change (Inan & Lowther, 2010) and the effective integration of digital technologies.

Another important aspect of the analysis of teachers' beliefs - use of technology relation is teachers' concepts on another dimension of teaching activity, evaluation. Although the concepts of evaluation are closely related to teachers' beliefs on teaching, learning, and the curriculum, they have only later stirred researchers' interest. When referring to evaluation, specialists favor the term 'concepts', to that of 'beliefs' (for a thorough analysis see Opre, 2015), and it designates "a teacher's understanding of the nature and purpose of how students' learning is examined, tested, evaluated or assessed (Brown & Gao, 2015).

One renowned classification regarding the concepts on evaluation is that proposed by Brown (Brown, 2004, 2006; Harris & Brown, 2009). It comprises four types of concepts related to evaluation, characterized by the following assumptions: a. evaluation optimizes teaching and learning; b. evaluation makes students responsible for their own learning; c. evaluation responsabilizes institutions and teachers for their own efficiency; d. evaluation is irrelevant to both teachers and students. Apart from the last conceptualization, which actually reflects an "anti-purpose" (Brown & Gao, 2015), we can state that evaluation may be generally understood as serving two major purposes, often conflicting, accountability and improvement. From the accountability perspective, evaluation involves putting forward value judgments regarding the assessed performance that aims at establishing to what extent do students, educational institutions, and teachers accomplish the undertaken standards. Nevertheless, evaluation has also a regulating role in the learning process, not only a controlling or summative one, once the learning process is completed. Understanding its formative purpose, evaluation is oriented towards diagnosing and identifying the ways in which teaching quality can be enhanced. Therefore, evaluation may be considered a basic mechanism for supporting and optimizing learning.

Teachers may simultaneously have different concepts on evaluation. For example, they may conceptualize evaluation as an instrument for optimizing learning but, at the same time, as a method of making teachers responsible for students' learning. Although these conceptualizations of evaluation - accountability and improvement - are universal and generally characterize all teachers, the way in which they materialize depends on the socio-cultural context and on the policy framework within which teachers work (Brown et al., 2019). Therefore, teachers' concepts on evaluation will significantly reflect either

accountability or the formative dimension of evaluation, depending on which of the two major purposes of evaluation is considered to be more important for the educational system where teachers work. The more teachers feel the pressure of the summative purpose of evaluation, the less the probability to understand and approach evaluation from a formative perspective (Brown & Gao, 2015). Moreover, under circumstances of educational crisis, such as the general crisis generated by the COVID - 19 pandemic, even when certain changes regarding the educational practices are legally enforced, the pressure exerted on teachers by these summative concepts is huge and negatively impacts the educational practices. In a recent study (Ferretti et al., 2021) regarding the evaluation methods used in the long distance learning context during lockdown, are identified a series of difficulties and impediments that teachers meet when compelled to include the formative evaluation strategies into their evaluative practices repertoire.

Generally speaking, in the majority of educational contexts, teachers are less exposed to the theory and practice of formative evaluation (Arrafii & Sumarni, 2018; Hasim et al., 2018; Puad & Ashton, 2021) and they rather use in class a predominantly summative evaluation. Beliefs on a certain phenomenon are formed gradually, based on the encounter with that phenomenon, later becoming the mechanism that outlines that individual's reactions and responses to the phenomenon (Ajzen, 2005; Brown & Gao, 2015; Fives & Buehl, 2012; Pajares, 1992). If teachers are not exposed to practical experiences of interaction with formative evaluation, they may develop incomplete and incorrect concepts about what formative evaluation is, how it is structured and which is the purpose it serves. In turn, these erroneous concepts on formative evaluation may often lead to the underestimation and non-use of the possibilities provided by digital technologies, despite the fact that digital technologies are considered an excellent instrument in supporting and promoting formative evaluation (Cusi et al., 2017; Irving, 2006). Therefore, the analysis of the way in which teachers conceptualize the formative and summative evaluation becomes a necessary step in order to effectively make use of all the possibilities provided by the digital technologies in the evaluation process of students' knowledge.

7. Conclusion

Digital technologies are a fundamental pedagogical instrument for nowadays educational environments and the way in which teachers make use of them conditions the learning outcomes. Teachers' ingrained beliefs on teaching, learning, and evaluation represent one of the strongest predictors of the way in which technology is capitalized. Pedagogical beliefs may support or obstruct the implementation of certain educational practices and also condition the profound changes occurring within these practices. In order to optimally take advantage of technology, we should not regard it as a purpose in itself, but rather subordinate it to some coherent teachers' beliefs attuned to the student and learning centered pedagogical paradigms. A thorough analysis regarding the nature and intensity of the relation between teachers' practices and teachers' beliefs will enable us to better comprehend the learning experiences that teachers are involved in and thus reconceptualise the development process of their didactic expertise.

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