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What to Expect When You Are Simulating?
About Digital Simulation Potentialities in Teacher Training

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ABSTRACT

While simulation is a proven teaching strategy, it has not had much development in the training of teachers. However, it has a lot of potential: risk elimination, high quality learning, reflective practice, didactic use of error, transition between theory, and practice. In addition to it, educational technology further enhances this potential: immersive digital environments enhance the realism of the simulations, help reflection, help overcome the time-space limitations, etc. To know the state of the matter on the potentialities of digital simulations in the training of teachers, a systematic review of the literature is organized, which allows us to know both the advances and the limitations in the use of this didactic strategy. On the one hand, it has been shown that digital simulations are effective in teacher training and that help cover current gaps; on the other hand, it is evident that there are technological limitations and shortcomings in research.

KEYWORDS

Digital Competence, MUVE, Pre-Service Teacher, Simulation, Systematic Literature Review, Teacher Training

INTRODUCTION

Simulation is a strategy commonly used in education, which has found, in the last decade, a growing interest in the possibilities of digital technology. In itself, the simulation allows: (1) students to learn in a safe environment, avoiding unachievable risks in the early stages of learning (Palés-Argullós & Gomar-Sancho, 2010); (2) to shorten the time needed for learning itself, so the learning curve is much more favorable (Vazquez-Mata & Guillamet-Lloveras, 2009); (3) to take a possible error to the end without consequences, which has an immense impact on learning (Ziv & Berkenstadt, 2008); the post-simulation debriefing to be much more rewarding than with other methodological strategies (Linares Saiz & SusinosRada, 2014); and (5) the learning experience to be much more motivating and transferable to reality (Norman, Dore, & Grierson, 2012).

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Digital technology, specifically 3D simulation environments as well as MUVEs (Multi-User Virtual Environment), offer new possibilities for learning (Cela-Ranilla, Esteve-González, Esteve-Mon, Gonzalez-Martinez, & Gisbert-Cervera, 2017; Clarke & Dede, 2010). 3D simulation allows us to replicate authentic contexts, and boost collaboration, strategic thinking, initiative, or experimentation (Dalgarno & Lee, 2010; Redecker, 2013). These environments have been used for the development of skills and competences in many fields of study, from medicine to engineering (Thomassen & Rive, 2010), being used in the initial formation of teachers as well (Chau et al., 2013; Christensen et al., 2011; Rayner & Fluck, 2014), a field in which we locate this investigation.

When we think about 3D simulation environments as scenarios to design teacher-training strategies based on simulation, imagine environments where pre-service teachers could interact with a myriad of avatars to represent all types of learning disorders, disruptive behavior, discouragement, and grotesque sociofamiliar cases to train our students with them. However, recent research suggests that: (a) from the technical point of view, despite the recent development of immersive technologies, it seems impractical to achieve this goal without a great team behind; and (b) from a pedagogical point of view, it is hard for us to think of a complete, rich, and complex enough battery of cases to be represented in the MUVE the diverse reality of the classroom the pre-service teachers will face and for which we should prepare them (Esteve-Mon, Cela -Ranilla & Gisbert-Cervera, 2016). In addition, all the potential of 3D simulation must be sifted through based on the intrinsic and extrinsic conditions of MUVEs, which will surely introduce specific limitations. For example, as Cantrell, Meyers & Mosack (2017) points out, a 3D simulator must just be the perfect setting for training of techniques and skills that can be acquired with a mechanized simulation, which in the case of teacher training, they are not precisely the most relevant.

Therefore, we need to know what the real opportunity these simulators provide is. We must know very well why the use of immersive technologies as a scenario for simulations can be very useful and can complement very well the current teacher training. And we must also be clear about the limitations we face in this specific case. This is the only way to contribute in this field, from applied research to border knowledge. What are the main potentialities of simulation as a teaching strategy? What can simulation bring to the training of teachers? And digital simulation, or the use of emerging technologies such as MUVEs, or virtual environments? And finally, what are the limitations of all of this? Firstly, we think that these questions can only be answered by a systematic review of the literature, which is the aim of this article.

PRESENT STUDY

The goal of the current review is to know which are the opportunities and limitations that simulation provides in teacher training processes from 2009 to 2017. So, the aspiration is to offer an overview of the situation of the subject, focusing on its principal potentialities and limitations (for instance, in terms of content and knowledge to be learned), and with a special interest in the technological issues related to it. This overview will be mainly centred in the pre-service teachers and the development of their professional abilities.

The research questions of this study are:

RQ1. What are the main potentialities of the simulation as learning strategy?
RQ2. What can simulation bring to the training of teachers as a learning methodology?
RQ3. What can digital simulation and simulation in virtual environments provide to pre-service teachers training processes?
RQ4. What limitations does the review of the literature diagnose in this context?

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