Teachers’ self perception on Digital Competence and OER use as determined by a xMOOC training course.

Theoretical framework

Teachers’ digital competence is becoming a crucial element for the construction of useful pedagogical knowledge for practice and, consequently, improvement of students’ learning. Digital competence (DC) is defined as the set of contents, skills and attitudes that are required when using Information and Communication Technologies (ICT) (Calvani, Cartelli, Fini & Ranieri, 2008). DC is a complex construct that comprises several dimensions. Ferrari (2013) proposes five areas that enclose 21 different skills therein: Information (ability to retrieve and analyze digital information); Communication (ability to interact with others and share resources through digital media); Content Creation (ability to elaborate and edit new digital contents as well as dealing with licenses and property rights); Safety (ability to offer data protection and digital identity security); problem solving (ability to identify digital needs and solve conceptual problems through digital media). Ferrari’s framework has been widely assumed in research but also often reduced to three core aspects: access information skills, evaluation skills, and communication skills (Aesaert, van Nijlen, Vanderlinde, & van Braak, 2014; Strømsø & Braten, 2014).

Learning digital skills in critical, creative, and flexible ways is therefore increasingly demanded in Teacher Education programs because they constitute the innovation driving force for teaching (Griffin, McGaw & Care, 2012). Part of this innovation comes in the form of Open Educational Resources (OER): open licensed digital media (i.e., Creative Commons, GNU or FOSS) that are created under teaching purposes. Main types of OER typically comprise course materials, software, videos, textbooks and other learning objects often used in online Teacher Education programs. Massive Open Online Courses (MOOCs), as one of the newest models of online education, prompt the use of OER within massive interchanges and interactions among course facilitators and peers (Caswell, Henson, Jensen & Wiley, 2008). The scalable nature of MOOCs (King
et al. 2014) ultimately enables a personalized adaptive learning experience to its users (Kaplan, 2014). New comers’ generations are increasingly feeling more comfortable with online types of education and, above all, with the use of digital media resources and user-generated contents in classroom (Pucciarelli & Kaplan, 2016). This change calls for new teachers’ qualifications to effectively deal with ICT in their teaching. However, most teachers do not perceive and recognize themselves as digitally prepared to combine technological resources (i.e., OER) with regular teaching instruction. For instance, the ICILS 2013 technical report (Fraillon, Ainley, Schulz, Friedman & Gebhardt, 2014) revealed that around 65% of teachers belonging to a random sample of 3,300 schools from 20 OECD countries made use of the classroom computer for teaching purposes. Similar results were obtained in the TALIS (OECD, 2014) report.

**Research questions**

This study specifically aims at (1) describing teachers’ self-perception in DC as well as the use they make of OER in classroom; (2) confirming whether there is a relation between Teachers’ self perception as being digitally competent and the use of teachers’ OER in their teaching; (3) analysing teachers’ opinion about what they learnt about DC after completing a MOOC course.

DC in this study is defined as the set of abilities that enables teachers to operate, communicate and create educational contents. These skills refer to basic computer management, fluent internet use, social media use, knowledge on digital tools and materials for teaching, and software text processing skills (i.e, word, powerpoint, prezzi, etc.).

The use of OER is defined here as the implementation of free licenced open media in classroom that serves, in various degrees, as instructional material that complements teaching.

**Methods and data sources**

This study is part of a research project entitled: “Comparative study in the development of digital competence under MiCompu.mx program” that was financed by the Mexican fund SEP-SEB CONACYT in 2013. A group of 863 in-service teachers from elementary, secondary, and tertiary education representing various disciplines participated in a MOOC course called: “Digital Competences” hosted by a renowned
international university. A 26-item validated Likert-type questionnaire on a five-degree scale of responses, ranging from 0= none; 1= basic; 2= intermediate; 3= Advanced; and 4= Expert, was delivered to the participants. Reliability test for the full questionnaire handed in a Cronbach alpha score of 0.93. Additionally, two open questions to a cohort of 207 participants about what they learnt in the MOOC course were asked. Course facilitators weekly reports (n=12) were also collected containing information about Frequently Asked Questions (FAQ) and positive/negative aspects that were addressed by participants during the MOOC course. Weekly reports have not been analyzed yet. We used a mixed methods research design as the methodological approach for the study (Johnson & Onwuegbuzie, 2004). Descriptive statistical analysis for the Likert type questions (i.e. frequency analysis, measures of central tendency and dispersion) as well as a correlational analysis based on an ordinal logistic regression (PLUM test) were conducted by using SPSS v21. Logistic regression showed more statistical adjustment than other types of regression (i.e., linear regression) in order to respond the second research question since we analyzed ranked data in a Likert scale instead of continuous data.

Finally, topical analysis was used for the qualitative data based on the Grounded Theory Analysis (Strauss & Corbin, 1994). Two independent raters assigned the codes for each topic. Cohen Kappa coefficient was calculated to measure inter-rater reliability (k=0.73)

**Results**

Scores in DC and OER use were ordered into three levels of performance: Low (little DC knowledge limited to accessing and retrieving information/ No use of OER, or sporadic use in classroom), intermediate (DC Knowledge focused on having access to information but also communicating to others / OER regular use as supplementary tools to ordinary teaching) and High (extensive DC knowledge so as to serve as teaching problem solving / Extensive use of OER in classroom as the main resource for teaching).

Most of the teachers showed intermediate levels of DC (495; 62.1%) whereas one third of the sample acknowledged low levels (277; 34.8%) and just a small portion of 25 participants voiced high competence (3.1%). On the other hand, participants’ use of OER leaned towards lower positions. More than 67.5% of the teachers acknowledged to hardly use OER in their teaching, whereas 31.6% ranked in an intermediate level.
The ordinal logistic regression (PLUM test), along with the Nagelkerke coefficient (pseudo R square) estimate and the ANOVA test, led to the calculation of the logarithmic regression equation \((y_i= \ln a +b*\ln x_i)\) by which a maximum value of 4 in DC means a value of \(Y= 2.68\) in the use of OER.

In this regard, our model predicts that only in-service teachers that acknowledge themselves as digital experts (those who use technologies as tools to solve regular teaching problems) are able to show intermediate levels on the use of OER (limited to their occasional use as supplementary materials to regular teaching).

As for teachers’ main comments related to what they have learnt in the DC MOOC training course we extracted 332 topics referred to a three level category where the main groups were: (1) improvement of classroom students’ learning (147; 44.27%): many teachers indicated that being digitally literate would help them to boost their classroom students’ performance; (2) improvement of teaching strategies (139; 41.86%): some other teachers believed that learning DC would improve their general pedagogical skills; and (3) improvement of teachers’ communication SKILLS (46; 13.85%): Fewer teachers acknowledge the training MOOC course was useful as a way to get connected to other teachers and as a platform to build professional communities.

**Scholarly significance**

Educational policies worldwide are addressing resources to cut down the digital divide among school students (Zhou, Singh & Kaushik, 2011; Suba Rao, 2010) in an attempt to universalize educational opportunities among younger generations. In this enterprise Teacher Education plays a crucial role because teachers are perceived as key elements to implement that change by introducing ICT in classroom (also OER) since not all the digital natives that enroll in schools are digital competent.

Nonetheless, our study demonstrates that the implementation of OER in classroom needs of digitally competent teachers. This suggests that teacher education programs about DC are required in order to systematically train teachers to make regular use of OER in their teaching. In other words, if new generations of teachers should be prepared to use digital media such as videos, textbooks, audiobook or different software programs as a teaching support materials (intermediate level), we need to train teachers to be highly competent in the use of technological devices or tools such as computers, internet, social media and technical knowledge on digital tools for teaching. In this
regard, our study reaffirms the idea of giving more emphasis to ICT teaching training in order to support active teaching practices in schools. This has been repeatedly mentioned in international reports such as ICSL report, 2013; TALIS report, 2013; or the European Commission Report, 2013.

**Key references**


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