The Digital Dimension in University Traineeships: An Opportunity to Build Innovative Professional Teaching Competences

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Abstract

The article aims to illustrate the experiences of using digital technology in the internship of future teachers at the University of Bolzano - Faculty of Education.
In the Italian National Digital School Plan (2015) it is stressed that digital training is necessary not so much from the IT point of view, but as a necessary ground for the development of competences oriented towards innovation in teaching practice. As the National Teaching Training Plan (2016) – NTTP- states, universities are asked to build, in alliance with schools, the real spaces for the evolution of professional knowledge that should include an updated perspective of the basic skills of the teaching profession (pedagogical-didactic-relational) effectively supported by the use of digital technology, according to the model TPACK (Technology, Pedagogy and Content Knowledge). University of Bolzano is working, in some courses, toward these perspective, however an important part of this pedagogical-didactic innovation is played in the traineeship. Since 2016, the students of Faculty of Education have been using an e-portfolio to document and reflect on their personal and professional path and during the various indirect training workshops they share practices and reflections through digital and multimedial artifacts in a digital social platform.
This way, the internship is configured as a real playground for the development of those professional skills aimed to innovate teaching practices that characterize the guidelines of NDSP request , where it is highlighted that digital competence helps to build the logic of educational innovation.

Keywords: *digital competence, teaching innovation, teaching traineeship, School and Higher Education, TPACK, PNSD.*

1. Introduction

The National Digital School Plan (NDSP-PNSD, 2015)[1] has as its specific task to produce a "perceptible impact" on education in the digital age, in which the term digital should not be understood according a strict technological connotation. The term digital should rather assume a meaning of educational paradigm in which environments, relationships, methodologies and tools are intermixed and new languages and new possibilities are implemented, unprecedented compared to the paradigm known and experienced until now. As Galliani (2009) [2] says, technologies are considered according to three constitutive aspects: technological, semiotic and didactic-communicative, within a holistic-pedagogical vision.
In fact, if on the one hand "the development of ICT technologies radically influences the human condition by modifying our relations with ourselves, with others and with the world around us" (Floridi, 2015) [3], on the other hand the same technologies do not exercise some kind of change in the paradigm of education, if it does not reside in the mind of those who organize the educational system (Dewey, 1999)[4].
As reported in the OECD report (2015) “Technology can amplify great teaching, but great technology cannot replace poor teaching. In schools, as well as in other organisations, technology often increases an efficient process, but it may also make inefficient processes even more so) [5]“. In this context, it is stressed that digital training is necessary not so much from the computer point of view, but as a necessary ground for the development of skills oriented to the innovation of teaching practice. As stated in the National Training Plan Teachers (2016)[6] since the initial training of teachers, universities are then called to build, in alliance with schools, the real spaces of construction and evolution of professional knowledge oriented to the development of key skills (Perrenaud, 2002; DM 249/2010; Danielson, 2011;)[7-8-9] related to the teaching profession (pedagogical-didactic-relational - inclusive). Digital competence is part of the set of competences required of future teachers.
It is therefore interesting to explore two dimensions from this perspective:

- what is the state of the art of students in training with respect to digital competence?
- what is the reference framework for making digital training a full-fledged pedagogical-didactical training?

Finally, we would like to understand whether our experience at the University of Bolzano, Faculty of Education, based on the use of devices, tools and digital environments aimed at the construction of artifacts to be shared and on which to reflect in metacognitive terms (Bruner, 1997) [10] embedded within the internship process (and not separated) can build professional skills oriented to innovation.

2. Digital competences of students future teachers.

Current high-school students are generally born together with the Internet and have been variously referred to as "digital natives" (Prensky, 2001)[11], "the net generation" or Millennials, so it is believed that they are naturally familiar with the tools and logic of digital culture.

The report by McGarr, O. & McDonagh, A. (2019) Digital Competence in Teacher Education, concerning the project DICTE [12] reveals that the situation seems to be more complex and varied. In part 3, a lot of research is reported about “Pre-service teachers' levels of digital competence”. In general, research has shown that student teachers express both positive and skeptical vision towards technology used in education Koc (2013) emphasizes the ambivalence in the perceptions respect to the use of technologies in the classroom. therefore it is needed to ‘prevent student teachers from thinking technology as a quick fix to our educational problems or as a threat to disrupt our educational activities’ (Koc, 2013, p. 7)[13].

In Norway, Gudmundsdottir and Hatlevik (2018 [14]) also found similar data, as well as in Spain, where McGarr and Gavaldon (2018) [15] have pointed out that their research shows positive perceptions of the use of digital technologies in teaching, but simultaneously expressed reservation about ‘too much’ use.

Like Ng (2012) [16] says ‘these findings are reflected in the levels of digital competence in the general student population which suggests that many students are not as actively engaged in content creation with Web 2.0 tools as expected’.The studies show there it is a gap between a personal and professional/pedagogical use ‘dispelling the common myth of the ‘digital native’(McGarr,& McDonagh, 2019). The conclusion of McGarr, O. & McDonagh, A. (2019) report on students' skills highlights a further problem: who and how to develop students' digital skills within higher education.

In this regard, Elstad & Christophersen assert that ‘current teacher-training programmes, however, have received extensive criticism, which has suggested that the development of professional digital skills is consistently weakly implemented in teacher training’.(Elstad & Christophersen, 2017, p. 5)[17].

The NSPD (2015) is directed exactly towards this perspective, requiring universities to use digital technology naturally integrated into pedagogical training and teaching practices.

3. The TPACK framework.

Pedagogical innovation in education is not just about technology management, but about the interaction between technology and pedagogy. Owston (2007) emphasized that pedagogical innovation using ICT requires specific teacher support ‘for without this [support] the innovation simply cannot occur’ (p. 69 [18]). According to Janssen, Knoef and Lazonder (2019) [19]’ a well-respected model that portrays the professional knowledge teachers should possess is the Technological, Pedagogical and Content Knowledge (TPACK) framework. This model acknowledges the interrelations between teachers’ knowledge of ICT – i.e. technological knowledge and pedagogical knowledge, and adds content knowledge as another essential element required for the effective use of ICT in the classroom’ (Herring, Koehler, & Mishra, 2016) [20].

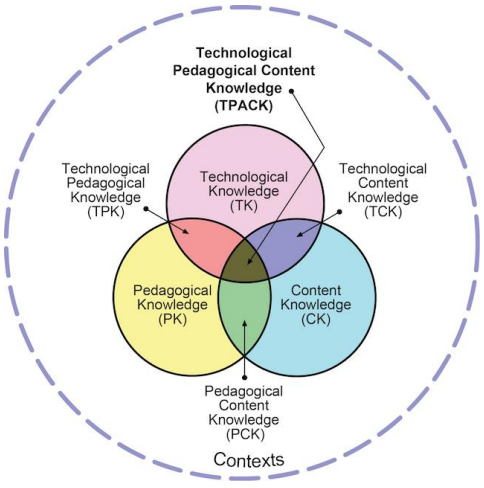

Fig. 1: TPACK model. Reproduced by permission of the publisher, © 2012 by tpack.org

From this perspective, a competent teacher is able to connect three dimensions: pedagogy, content and technology. Therefore, not only competent in the relation to technology itself, to pedagogy and to the specific content of its subject, but especially competent in those uses of technology that support adequate pedagogical strategies for teaching.
Di Blas (2018) also recognizes the importance of acquiring the domains of technological and pedagogical knowledge in situated and authentic activities. It is necessary to learn to use resources to operate the integration of technological tools: in other words, it is not necessary to make the teacher a "technologist" (Di Blas et al. 2018, p. 27)[21]. The authors carried out a research on how Italian universities are dealing with the TPACK model in the faculties of education sciences. The Italian school and university reality has not so far officially adopted the TPACK model as a conceptual reference framework in the definition of initial and continuing training courses for teachers. However, methods and paths have been introduced that, although not explicitly referring to the model in question, highlight positive trends of integrated/balanced components of disciplinary teaching, technological knowledge and methodological-pedagogical-didactic (Di Blas, p. 32, 33).

3.1. The practices (TPACK) at the Faculty of Education of Unibz

The Faculty of Education at the University of Bolzano, Unibz, is listed in Di Blas's survey: it has been activated some lectures related to media pedagogy and technology and educational workshops with particular focus on the area of music-aesthetics.
However, an important part of this pedagogical-didactic innovation is played in the traineeship path and this does not appear in the Di Blas's research. Since 2016, students of Faculty of Education Unibz have been using a digital device, an e-portfolio to document and reflect on their personal and professional development (Ravanelli, 2017) [22], and during the various indirect training workshops they share reflections and artifacts done by individuals, couples or groups-works in a digital platform.
We will explore these practices in following paragraphs, underlying the benefits, in terms of professional development and particularly in increasing innovative view of learning and teaching.

3.1.1. The e-portfolio as digital learning environment

As reported previously, since 2016, the whole number of students at the Faculty of Education have been using an e-portoflio in order to document and reflect on their personal and professional improvement, collecting their experience at school during the direct traineeship and further discussing whit peers and tutor.
The digital environment we adopted, an opensource platform – Mahara, allows students to use various forms of language in documenting their work: written, photo, video, audio, often combining them and producing multi-media works. By doing so, they become consciously "producers rather than consumers of digital content (Unesco, 2005, p.179)" [23].
Multimedia documentation makes the next phase in which the students share and discuss their experiences, more attractive, more situated and therefore more comprehensible for peers and tutors, who can thus give better feedback. Hattie (2012) [24] emphasizes the importance of the feedback in the learning process. In addition, during this documentation process, students have to be careful in respecting the rules of privacy by selecting information and becoming more aware of the ethics of digital communication.
To summarize, using an e-portfolio, the students can practice the digital competence towards a specific professional focus and in the same time they can acquire the awareness that a digital environment enriches their personal and professional growing. This way they are enabling to communicate creatively, to improve reflective and ethical skills, to share their work with a learning and professional community, to give and receive feedback in order to do a co-assessment. These aspects are included in the profile of key competences listed by the European Union (Lisbon 2006) and the most updated European DigiCompEdu framework for teachers (Vouarikari et al, 2016) [25].

3.1.2. The indirect traineeship workshops: a space for innovation.

Indirect traineeship workshops are key element in the training of future teachers. They are the spaces where students design their own activity, share it, analyze and improve it collaborating with peers, tutors and teachers. They are opportunities of planning professional practice and reflecting on the same. It is important that future teachers can use these spaces and times to effectively practice digital competence. We have therefore adopted the Moodle Learning Managing System (LMS), to expand the classroom and to encourage sharing and reflection practices through forum as discussion spaces.
Social, relational and reflective skills (Schoen, 2006)[26] are part of the professional competences listed in the italian professional profile of teachers (DM 2010). A digital learning environment

contributes to their practice and improvement. In the workshops, students describe their experiences or reflections through digital artifacts that they then share in the digital environment.
Future teachers are asked to use different digital tools to externalize their products. They can make digital posters, videos, interactive maps, digital storytelling, podcasts, and so on. According to Bruner (1997), externalization is an important principle in education because it makes possible to see and show one's work and this promotes interaction, reflection, self-esteem that Bruner considers as other relevant principles in the educational process. The students experience in their own learning path how much the use of digital tools enables to produce creative, multimedia artifacts, suitable to be shared and always editable according to the feedback of peers or teachers. Moreover, the use of different expressive channels and languages promotes the inclusion of differences, according to Profile of Inclusive Teachers (European Agency for Development in Special Needs Education , 2012) [27].
In the internship workshops other digital tools are used by teachers or tutors to collect in real time ideas, thoughts, questions, summaries etc. This way it is possible to get an immediate participation of the whole group, represented through words clouds, graphics, quizzes, maps etc..
Here we consider the aspect of externalization but, above all, of participation for the construction of shared meanings according to the perspective of social constructivism theory (Barak, 2016) [28].
It is interesting to highlight that these participatory practices are allowed by the use of digital mobile devices that students normally use in their personal lives. It is a matter of adopting the BYOD (Bring Your Own Device) model to establish a link between personal and professional practices. According to Cochrane et al. (2014) [29], BYOD could be considered a framework for creative pedagogies.
Our experience seems to demonstrate that the systematic, situated, meaningful and embedded use of digital tools and environments in the learning path of future teachers, contributes to build digital but also pedagogical and professional skills (TPACK) that will innovate the future of their teaching practice.

4. Conclusion

While using digital technologies, students, future teachers, need support and specific scaffold to understand the effective use in teaching practices. The reference framework seems to be the TPACK, which combines the pedagogical dimension with the technological one. Universities are innovating their courses to incorporate this approach. The students of the Faculty Education at University of Bolzano, are using tools and digital environments to document, reflect and share their internship experiences. This is an opportunity to explore digital environments, to use various kind of digital tools, to produce multimedia, multi-channel, sharable artifacts in a situated, authentic dimension, incorporated and not separated from the professional development path. By doing so they are developing the digital competence provided by the EDUCOMP framework that will allow them to become innovative teachers.

References

[1] MIUR . Piano Nazionale Scuola Digitale. 2015 . http://bit.ly/2eJ14sK
[2] Galliani L., Formazione degli insegnanti e competenze nelle tecnologie della comunicazione educativa. Italian Journal of educational Research, n.2-3. 2009.
[3] Floridi L., The Online Manifesto. Being Human in an Hyperconnected Era. Springer Open(2015),
[4] Dewey, J. Le fonti di una scienza dell'educazione. Firenze: La Nuova Italia, 1999.
[5] OECD, *Students, Computers and Learning: Making the Connection*, Paris, OECD Publishing, 2015. http://dx.doi.org/10.1787/9789264239555-en
[6] MIUR Piano per la formazione in servizio dei docenti 2016-2019.
[7] Perrenoud, P. Dieci nove competenze per insegnare. Invito al viaggio. Roma: Anicia, 2002.
[8] D.M. del 10/09/2010, n. 249. *Definizione della disci- plina dei requisiti e delle modalità della formazione iniziale degli insegnanti della scuola dell'infanzia, della scuola primaria e della scuola secondaria di primo e secondo grado*
[9] Danielson, C. *The Framework for Teaching Eva- luation Instrument.* Princeton NJ: Danielson Group, 2011.
[10] Bruner, J., La cultura dell'educazione. Firenze: la Nuova Italia,1997.
[11] Prensky, M.,Digital natives, Digitl immigrants. On the Horizon(MCB University Press, Vol. 9 No. 5. 2001.
[12] McGarr, O. & McDonagh, A. (Digital Competence in Teacher Education, Output 1of the Erasmus´funded Developing Student Teachers' Digital Competence (DICTE) project. 2019.
[13] Koc, M. Student teachers' conceptions of technology: A metaphor analysis. Computers & Education, 68, 1-8. 2013.

[14] Gudmundsdottir, G. B., & Hatlevik, O. E. Newly qualified teachers' professional digital competence: implications for teacher education. European Journal of Teacher Education, 41(2), 214-231. 2018.
[15] McGarr, O., & Gavaldon, G. (2018). Exploring Spanish pre-service teachers' talk in relation to ICT: balancing different expectations between the university and practicum school. Technology, Pedagogy and Education,27(2), 199-209. 2018.
[16] Ng, W. Can we teach digital natives digital literacy? Computers & Education, 59(3), 1065-1078. 2012.
[17] Elstad, E., & Christophersen, K.-A. Perceptions of Digital Competency among Student Teachers: Contributing to the Development of Student Teachers' Instructional Self-Efficacy in Technology-Rich Classrooms. Education Sciences, 7. 2017.
[18] Owston, R. Contextual factors that sustain innovative pedagogical practice using technology: An international study. Journal of Educational Change, 8, 61–77. 2007.
[19] Noortje Janssen, Miriam Knoef & Ard W. Lazonder Technological and pedagogical support for pre-service teachers' lesson planning, Technology, Pedagogy and Education, 2019.
[20] Herring, M. C., Koehler, M. J., & Mishra, P. Handbook of technological pedagogical content knowledge (TPACK) for educators (2nd ed.). New York, NY: Routledge. 2016.
[21] Di Blas, N., Fabbri, M. & Ferrari, L. Il modello TPACK nella formazione delle competenze digitali dei docenti. Normative ministeriali e implicazioni pedagogiche. *Italian Journal of Educational Technology, 26*(1), 24-38. 2018.
[22] Ravanelli F., L'e-portfolio come dispositivo per accompagnare la formazione degli insegnanti nel quadro del PNSD, ISSN 2038-3002 – Vol. 8, n. 2, anno 2017, 196-210
[23] UNESCO. Towards knowledge societies: UNESCO world report. 2005.
[24] Hattie, J. Visible learning for teachers: Maximizing impact on learning. New York, NY, US: Routledge/Taylor & Francis Group. 2012.
[25] Vuorikari, R., Punie, Y., Carretero Gomez S., Van den Brande, G., DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model. Luxembourg Publication Office of the European Union. EUR 27948 EN. 2016.
[26] Schön, D.A., *Il professionista riflessivo. Per una nuova prospettiva della formazione e dell'apprendimento nelle professioni*, Milano: Franco Angeli 2006.
[27] Profile of Inclusive Teacher, TE4I, European Agency for Development in Special Needs Education
https://www.european-agency.org/resources/publications/teacher-education-inclusion-profile-inclusive-teachers. 2012.
[28] Barak, M. Res Science Teacher Education in the Twenty-First Century: a Pedagogical Framework for Technology-Integrated Social Constructivism Sci Educ 47: 283. 2017.
[29] Cochrane, T., Laurent Antonczakb , Helen Keeganc and Vickel Narayan, Riding the wave of BYOD: developing a framework for creative pedagogies, Research in Learning Technology Vol. 22, 2014