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Technology and the initial participation of teachers in education: a laboratory experience on Distance Learning in the Primary Education Sciences degree course

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Abstract

The social, cultural and economic changes of this century have inevitably also affected the world of education and training, which, therefore, have renewed paths, objectives and goals.

Internalised knowledge must be re-used creatively in a new context. 'Knowing' becomes 'knowing how' and then 'knowing how to be'. Learning is lifelong and is understood as the right/duty of the citizen, who in the globalised world, needs to acquire increasingly specialised skills to face the continuous challenges that modern society offers.

In this perspective, technology should not be exclusively understood in its most technical dimension; it is a precious opportunity for training and learning-teaching. In other words, this work intends to highlight the multi-dimensionality that distinguishes it and allows every teacher, who knows how to use it consciously, to variegate and personalise their educational proposal.

The laboratory, which is intended as a new didactic space, becomes a privileged place for the educational relationship between teachers and learners, who, supported by technology, creatively reach the objectives set out.

Keywords: *skills; education/training; laboratory; media literacy; educational technologies; learning*

Introduction

In the sociocultural and pedagogical landscape of recent years, we are witnessing an important change compared to the founding themes of education. The concepts of knowledge and learning have changed radically because their meaning has more significance and is more widespread.

The mere acquisition of knowledge is overcome by the need to immediately acquire expendable skills. Internalised knowledge must be re-used creatively in a new context. 'Knowing' becomes 'knowing how' and then 'knowing how to be'. Learning is lifelong and is understood as the right/duty of the citizen, who in the globalised world, needs to increasingly acquire specialised skills to face the continuous challenges of the contemporary labor market. Expertise is:

> Having the knowledge and knowing-how, which is applicable to different contexts, and is transferable, integrable, refinable, renewable; it is knowing how to acquire skills and use them, implying that is has a metacognitive path, a mindset based on learning-to-learn and on a 'well-built mind'; being able to rethink one's training and if necessary reconstruct it and – at the same time – dominate the context in which the place of work is collocated and critically dominates it. (Cambi, 2004, pp. 39–40)

Only in this way the students become active subjects in the construction of their knowledge and identity and acquire awareness of their learning process. According to Quaglino:

> The training path should not be reduced, for those who benefit from it, to an instructive moment, and a mere transmission of basic knowledge, but should contemplate a transformative action on the part of the subject and therefore respond to an internal question of the person, dictated by desire to know each other better and to fulfill oneself while respecting one's potential, rather than adhering only to the external need of having to place or relocate professionally. (Quaglino, 2004)

Therefore, it is seemingly clear how the educational programs of universities should be renewed since it is urged to respond to the new scenarios driven by a dynamic and constantly fermenting society such as today.

In today's interconnected society, knowing how to do one's job well is not enough, but it is necessary to have the so-called European citizenship skills.

Indeed, in March 2020, the Executive Council of the European Union in Lisbon undertook to promote

> And to support new forms of alliances between the research communities and the territory, between the training curricula and the skills required by the professional world and, last but not least, between university teaching and the personal and professional development processes of the students. (Fabbri, Rossi, 2008, p. 9)

The university is now called upon to develop and enrich the educational program to encourage students to become aware of the world of work in its most modern sense and therefore, which is broader and more flexible.

The university becomes a place where:

> Learning means participating in communities of practices, sharing a system of activities that allow new interpretations, a mobilization of particular interests, themes, people, concepts that gradually become solidly linked to each other, so much so as to form networks that unite and hold together traditions, local choices, particular resources with common paradigms that are interpreted differently. (Fabbri, Rossi, 2008, p. 12)

Rossi writes:

> The organization as a training and learning community and the highly trained human resource that represent the strategic components in order to better respond to the challenges of the market (...) human qualities, obtained greatly through education and training, play a fundamental role in promoting and supporting the development and well-being of individuals and nations (Rossi, 2012, p. 22).

In this paradigm, technology becomes qualifying, at the service of education and learning at all training levels.

1. Teacher training for the development of digital skills

During the last decade, in the European context, great emphasis has been placed on digital competences, which, in fact, have been included among the eight basic competences of Recommendation 2006/962/EC of the European Parliament and Council.

The emphasis has been placed on new digital and network technologies, with particular attention to access and the technical ability to use the new tools, especially with the view of future employment (Buckingham, 2009). At the same time, the research is focused on the elaboration of theoretical models for the concepts of media and digital literacy, identifying in these notions a fundamental competence to move in a conscious and critical way to exercise digital citizenship (Buckingham, 2013; Calvani, Fini & Ranieri, 2010; Hobbs, 2010; Jenkins, 2010; Rivoltella, 2008).

However, the term media literacy refers not only to technical competence, but also the ability to create and use technologies to participate and contribute to social, cultural, political and economic life, mobilising internal and external resources (Calvani, Fini, Ranieri, 2009, p. 40).

It is clear that the emphasis placed on the critical understanding of the media still remains, while attention paid to the productive/creative dimension is also strengthened. In short, digital literacy is the 'wisdom' that allows one to participate in the digital world in a meaningful and secure way (Rivoltella, Rossi, 2019, p. 232–236).

Teacher training needs to be explored and rethought. If it was once based on providing a wide range of strategies and knowledge, today a process aimed at having a professional vision, able to analyse experiences from a holistic perspective, of setting up knowledge and research paths for one's own professional development must be supported (Margiotta, 2007), (PNSD, 2015), (Digicomp, 2018), (C.E., 2013).

The pandemic has made the emergency of re-qualifying skills in this area with innovative and improving projects very clear.

Under these difficult circumstances, it is more important than ever to create conditions to develop creativity and participatory training. It seems opportune to rethink didactics, teacher training, educational research and the knowledge and models in terms of innovation and adaptation to the new situation (Rivoltella, 2021).

2. The experience in the didactic technology laboratory

2.1 Theoretical reference framework

The planning of the laboratory activities was carried out with the aim of encouraging the development of knowledge by using an inductive approach and teaching methodologies centred on the active role of the student in which interaction, collaboration between the subjects and the reflection in action become the most significant features for fostering learning through experience (Dewey, 1949).

From a methodological point of view, we used an approach which, according to Tessaro's classification (2011), allowed us to carry out activities such as:

- situation analysis: students experimented with methods of approach and analytical skills to face problems;
- simulation: the operational proposal to implement the design of an activity;
- operational reproduction: participatory planning in a group;
- cooperative production: the group, as a learning community, is intended as a place for the elaboration of ideas, designs and production.

The organisation of the laboratory represented a comfortable environment intended as both a physical and cognitive space. In fact, through the laboratory activities, the students transfer and adapt the disciplinary contents in a protected context in which reflection in action (Schön, 1993) becomes the tool to build their skills.

In this sense, the laboratory must be considered as a place of situated learning (Lave, Wenger, 1990) where the importance of the contexts in which the participants are involved in concrete actions must be emphasised, and where they interact with peers to find solutions to problem-situations. It represents the right place to establish a collaborative and participatory climate in which relationships between peers are linked to common interest and not to the individual (Perla, 2011). We are faced with communities of practices (Wenger, 2006) where interaction and participation motivate those involved in designing and creating.

The laboratory, a training ground for real life, as Dewey stated, becomes the training space in which the subject is able to implement, through practice, the dialogue between disciplinary skills and technical-professional skills, and where everyone has the possibility to manifest their potential (Dewey, 1949).

The cooperative use of technologies can represent the added value for an effective teaching action (Wells, 2007; Messina, 2012) and, in professional practice, it is even more advantageous to use collaborative modalities where each pupil plays an active and participatory role (Higgins et al., 2012).

To plan this laboratory, inspiration from the director of the research group 'Lifelong learning Kindergarten' at MIT in Boston, Mitchel Resnick, who proposes a type of creative learning was taken. It was thought it could be an effective tool to facilitate the development of creative thinking of future teachers and to enhance media literacy.

According to Resnick, the spiral of creative learning (imagining, creating, playing, sharing and reflecting) is the engine of creative thinking. Through this spiral, students can develop and refine their ability to think creatively, learn to develop ideas, test them, experiment with alternatives, listen to others and generate new ideas based on their experiences.

As they go down the spiral, they develop and improve their creative thinking skills.

The development of projects is guided by the 4 'Ps' of creative learning: Projects, Passion, Peers and Play.

The students are supported when working on projects they are passionate about, in collaboration with peers, in a playful context that encourages experimentation (Schmidt et al., 2014), (Brown et al., 1989), (Lave and Wenger, 1991). This process is structured to support students in finding different personal learning paths as they create community through shared experiences (Gabaree et al., 2018).

It is believed that the social context for learning is critical for students of all ages. Social–emotional learning (SEL) research makes it clear that learning and brain development are dependent on social–emotional experiences and opportunities to have an active and safe engagement with meaningful relationships and environments (Immordino-Yang et al., 2019), (Schonert-Reichl, 2019; Jones and Kahn, 2017), (Ito et al., 2020).

Therefore, it is good to provide students with opportunities so that they can engage in creative activities that boost the creative process in meaningful contexts in an educational process (Resnick 2017, 10–12, 36–40).

2.2 The laboratory experience

The 'Didactic Technologies' laboratory was carried out in the 'Primary Education Sciences' degree course at 'Kore' University of Enna. It is a 30-hour-long 3-credit laboratory aimed at second-year students, with compulsory attendance.

In the academic year 2019/2020 it involved 219 students, 12 male and 207 female.

In the academic year 2020/2021 it involved 297 students, 19 male and 278 female.

The laboratory activities, in general, take place in person. Last year, because of the health emergency due to Covid-19, they took place online (and they are being conducted online this year as well).

The tools used were the 'Moodle' platform of our university and 'Google Meet' for the shorter lessons held in order to start the activities proposed to the students, which had to be handed in on a specially designed forum.

The objectives of the laboratory are:

- develop digital skills in didactic planning;
- experiment with shared working methods through simulation;
- favour the structuring of a flexible, participatory and reflective mindset;
- design teaching by enhancing tools suitable for the target and team sharing; promote meta-reflection on one's own communicative, educational and planning actions taken in the course of the laboratory.

Conceptually, we referred to the formative path of a MOOC (Massive Online Open Course), LCL (Learning creative learning) created by the Lifelong learning Kindergarten group of MIT in Boston (https://learn.media.mit.edu/lcl/).

The activities were carried out over six days (like the days in the Decameron) and were also inspired by the 4 'Ps' mentioned above. In fact, I proposed a short video on the subject.

- A brief presentation of the students and the expectations of the laboratory.
- Activity 1: Childhood objects.

The students were asked to think of an object from their childhood that they liked and that had influenced their growth.

The students presented and shared photos of the objects they played with as children.

- Activity 2: Project, let's create something.

The students were asked to create a project and share the creative process with the group.

They could create anything using paper, wood and Scratch, for themselves, or someone else, for work and for fun anywhere indoors, in the kitchen, the living room, on the balcony or outdoors.

- Activity 3: Passion, animate your passions.

The students were asked to explore Scratch (https://scratch.mit.edu/) or other digital tools to create a project that involved something or someone they particularly cared about.

- Activity 4: Peers, Let's remix

The students were proposed to create a 'remix'. They had to choose one of the projects shared by their fellow students or any other project that inspired them and create their own version of it.

- Activity 5: Game: Let's Tinker

It was suggested that the students take some time to play and 'tinker' with something. The concept of 'tinkering' is a form of informal learning in which one learns by doing (Resnick 2017, 111–115).

- Activity 6: I used to think ... but now I think ...

The students were asked to share their reflections on the experience they had acquired by completing the sentence.

A further support to the group was a Wiki called 'Toolbox', where the whole group could share tools deemed useful for them.

2.3 Conclusion and results of the laboratory experience

The idea of the laboratory was born from the need for university students to experiment with an educational path during which the didactic approach was implemented using technologies through the creation of authentic activities aimed at building new and complex learning products.

They used technological and non-technological tools, materials and real-life problems to stimulate the students' passion for learning, curiosity about the world, the ability to commit, tenacity and perseverance in thinking bigger. The activities of the didactic technology laboratory were organised and proposed in such a way as to try to structure the educational setting as a space of dialectic interaction between theory and practice (Damiano, 1999) for the development of generative learning (Lingard et al., 2003; Margiotta 2007).

On the basis of these theoretical perspectives, it is possible to present, in a first phase of the research, which is still in progress, one of the evaluative descriptors chosen. The feedback received from the students, as a result of the laboratory experience carried out, was identified as a descriptor, which will be followed by an accurate coding at the end of the text (Trinchero, 2004, 150).

The assessment descriptors of the activities are identified in the feedback received from the students following the laboratory experience. In the following, we selected one of the most significant comments received at the conclusion of the activities in order to document the work carried out.

One student's opinion seems to have fully embraced the objective of the activity fully:

> «I savored the pleasure of doing what I like and noticed that, despite being overwhelmed with lots of things to do, when I was working on the assignments, I realised it was quite pleasant ... and at this point I began to reflect on the learning processes and I thought it was something I could do one day with my students, ask them to follow their passion and then I began to reflect on how many possible ways of teaching there are».

The students experienced the laboratory activities, received gratification, and enjoyed learning. They studied the 'theory' and tested its 'effects' first-hand.

The result, in our opinion, was one of greater motivation, participation and responsibility of each student, and also these features, in our opinion, constitute further premises that can encourage their future choices as teachers.

Indeed, we as 'university professors' also need to promote a culture that allows us to understand the current condition in order to prepare for the world of work and life (Morin, 2000). If you intend to open up students' minds, the challenge

also lies in ensuring experiences aimed at mastering procedures and the best practices that can subsequently be used by future teachers to respond to the needs of their pupils.

Conclusions

It is important to care for people beginning from university education. Therefore, it is becoming more and more common to see the educational and training processes in their entirety with respect to personal and social development. The emphasis is increasingly placed on responsibility in work organisations, work ethics, work as an opportunity for growth and exchanging ideas on a personal as well as professional level, a place in which to show one's skills and responsibilities.

Among the many changes that were noticed are those related to the continuous updating of professionalism and the development of empowerment[1] that challenges media and media education more than ever today.

Active and cooperative methodologies enhance the relationship between learning and action. Laboratories, training groups and role-play, for example, facilitate the individual's awareness of relational and communicative dynamics implemented during the process of 'exchange'; therefore they are used, above all, to foster the ability to work within the group.

All these needs will have to be taken into account during the training and university 'time', in particular, and in some already widespread and positive cases this has been done. The places of the disciplinary lessons, especially those related to pedagogical and psychological subjects have gradually transformed into experiential spaces in which the gap between theory and practice tends to disappear in favour of a territorial synergy through internship and work placement activities. The methodological choices made in the classroom, that put the student in particular situations, allowed them to acquire and experience the most current forms of insertion and co-operation within organisations, in the light of the current educational emergencies of life-long learning.

All of this affirms that there is a stringent link between employability training and good results in terms of learning, teaching and didactic assessment (Yorke & Knight, 2006) aimed at ensuring a more conscious growth of each student and their abilities.

In light of this, a reflection on new forms of teaching and learning will be necessary.

The reflection was oriented on the training processes concerning knowledge workers going beyond the standards of just adult education and learning the contradictory dynamic between formal and informal education throughout the life span as the basis.

Professionally, people find and experiment with all the dimensions of their own personality: cognitive, cultural, motivational, ethical, spiritual, social and creative. This guarantees the possibility to develop personal and professional skills.

Professional training must be able to generate the capacity of reflection with the prospect of 'caring for' by promoting the well-being of and in the organisations in which the person is appreciated and gratified as well as respected (Di Nubila, 2005).

What is obtained is knowledge that never ends, but remains infinitely open to new meanings, insights and points of view. In this perspective, the university is actually open only when one asks first what students should learn and only then what to teach. In this way, the educational process becomes a transforming practice. A metacognitive attitude, thus, becomes a strong predictor of motivation for effective teaching. Not only does it stimulate the increase of metacognitive skills in students, but it also becomes, for them, a source of motivation to learn.

If, on the one hand, in terms of planning, it is necessary to ensure the minimum curricular contents, on the other hand, it is also necessary to ensure the acquisition of an open, flexible and interdisciplinary mindset that is willing to exchange ideas and change. This mindset allows students to acquire technical curricular and professional skills, which can be combined with the development of life skills (Boffo, 2012).

Technology offers a precious opportunity for training and learning–teaching skills, thanks to its multi-dimensionality aspects with the help of which every teacher, who knows how to use it consciously, will be able to diversify, customise and individualise their educational proposal for a group of students as a whole and individually.

The laboratory, if intended as a new educational space, becomes a privileged place for the educational relationship between teachers and students, who achieve goals and objectives in a creative, personal and unique way while being supported by technology.

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[1] The term empowerment refers to a multi-disciplinary and multi-level concept, which indicates both a subjective psychological experience and objective conditions of the context in which individuals develop their experiences.

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