



Teachers' Skills and Innovative Educational Practices: An Evaluation Study on the Effectiveness of a Training Path

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Abstract

In the Italian context, National Recovery and Resilience Plan [1] suggests the adoption of teaching approaches characterized by technological and digital innovation and a transdisciplinary connotation, in line with literature according to which training paths for teachers should increase teachers' professionalism, as well as their attitude to incorporate elements of innovation into educational practices to make them effective [2]. Within this framework, using a pre-post comparison design, the current study evaluates the effectiveness of a training path about new techniques of teaching-learning useful to innovate teachers' educational practices and increase teachers' self-efficacy.

The study included 248 Italian teachers (77% women) ranging in age from 23 to 65 years old ($M=49.4$; $SD=9.6$). Two ad hoc scales were used to test teachers' digital skills and educational practices, while perceived personal effectiveness in the school environment [3] and Teacher Self-Efficacy Scale (S.A.E.D., Italian validation by Biasi et al, 2014) were used to measure teachers' self-efficacy. Results of MANOVA highlighted significant differences between t1 and t2 with respect to digital skills ($F(1)=10.95$; $p=.001$), educational practices ($F(1)=20.64$; $p<.001$), and teachers' perceived personal effectiveness both in the school context ($F(1)=28.65$; $p<.001$) and in class management, students' involvement and learning strategies ($F(1)=15.16$; $p<.001$). Overall, the study shows the effectiveness of the training path examined as tools to improve teachers' professionalism, regarding the relational and the cognitive dimension, and their perception of self-efficacy in the school and in the classroom context.

Key words: Evaluation; Teachers' self-efficacy; Teachers' skills; Professional training; Innovative educational practices

Introduction

The COVID-19 pandemic has transformed society in profound ways, often exacerbating social inequalities in its wake. As regards education, data on learning loss during lockdown evidenced that students made little or no progress while learning from home. Particularly, learning loss seems to be even larger in countries like Italy, with weaker infrastructure or longer school closures, and most pronounced among students from disadvantaged families [4].

In this context, schools were called upon to design a significant restructuring of educational activities [5-7]. Teachers are entrusted with a responsibility that arises not only from understanding (knowledge, models) and know-how (tools), but also from knowing how to evolve (adaptive skills and professional flexibility), trying to aim for the development of specific skills such as organizational, relational, communicative, verbal, nonverbal, iconic, and

multimedia [8]. In fact, teacher professionalism must be seen as a system that watches and interacts with contextual systems, such as training environments, having the ability to observe, read, and interact with them while preserving their complexity [9]. Teachers who are successful in developing a good understanding of topics for their students, including those labelled “at risk,” share some practices: they assign engaging assignments that motivate learning [10], they foster awareness of learning through peer education, and they constantly evaluate students to identify their strengths and learning approaches. Moreover, teachers who can examine their own professional performance have a comprehensive and conscious attitude towards the educational process and specific teaching activities [11]. Albion [12] linked this sense of self-efficacy to teachers’ willingness to incorporate elements of innovation into educational practices [2,13]. Moreover, peer learning is a critical component of the professional development of learning communities operating in an evolving digital environment [14]: thanks to the comparison, indeed, teachers can improve what they learned during the training course into practice.

On the contrary, poor use of creative teaching approaches impedes the formation of a sense of self-efficacy which in turn precludes the sufficient building of the teacher’s identity, as well as failure to achieve intended results [15]. However, the frequency of “unqualified” teachers and the low teacher training rates had already been recognized by the National Teaching Commission [17]. To date, Italy’s strategies included in the National Recovery and Resilience Plan [1] suggest the establishment of a Higher Education School, responsible for providing online training courses for teachers to better connect pupil school education and teacher continuing education.

How this regard, the scientific literature considers technological and digital innovation such as enabling know-how for peer training and continuous professional development [17]. It promotes the integration of formal and informal, personal, and collective learning [18], as well as the development of critical thinking and cognitive abilities considered crucial in the global knowledge economy [19]. In this sense, technologies represent a comprehensive and complex possibility within which trainers can receive a blended update while also benefiting from an effective and accessible environment in which to learn how to use services and devices and appropriate these resources for the teaching of their discipline.

Based on this evidence, the European Commission [20] and the OECD [21] have called for the development of green and digital skills for all those working in education systems [22]. Accordingly, the most recent changes in Italy aim not only at value teacher identity, but also at adopting digital-based learning and teaching approaches with a transdisciplinary connotation.

Within this framework, the current study proposes to explore the effectiveness of a training path for the promotion of teachers’ digital skills, educational practices, as well as of teachers’ self-efficacy, using a pre-post comparison design.

Participants were part of a training program aimed at teachers included in a territorial project whose aim was to combat

educational poverty. This training, managed by a training agency and divided into specific modules, intends to promote new skills and educational practices.

Three hypotheses were investigated:

H1: The training improves teachers’ digital competencies.

H2: The training improves teachers’ educational practices.

H3: The Training increases teachers’ self-efficacy in the school and classroom.

Materials and Methods

Participants

The study included 248 teachers (77% women) ranging in age from 23 to 65 years old ($M=49.4$; $SD=9.6$) and with an average of 16 years of professional experience ($M=16.2$; $SD=10.00$) from five Italian cities, three in the centre and two in the south: Frosinone ($t1=24\%$, $t2=16,6\%$); Chieti ($t1=42,9\%$, $t2=23\%$), San Salvo ($t1=5,9\%$, $t2=14\%$); Vibo Valentia ($t1=7,9\%$, $t2=14,9\%$); Foggia ($t1=19,30\%$, $t2=31,50\%$).

Procedures

Participants were given a brief overview of the research objectives, followed by an invitation to engage voluntarily in the study. Procedures were conducted according to the standards published in the code of ethics of the American Sociological Association (2018). Participants were guaranteed the confidentiality of the data, and they were informed of their privacy rights.

Teachers were required to complete an online questionnaire which included multiple sections. The first section contains personal information (origin, gender, and age), employment history and subject matter imparted. A second made up of two ad hoc questionnaires used to investigate digital skills and effective educational practices, while two validated scales were used to test teachers’ self-efficacy.

Data analysis was conducted with the software Jamovi [23].

Measurements

Teachers’ digital skills: The scale consists of nine items that investigate how much a teacher feels capable of using, producing, and/or modifying digital material using the most common software (e.g. “How capable you are of using the various functions of the most popular software”), as well as and especially for students with special needs (e.g. “How much do you know how to use digital resources, such as map makers, e-learning platforms,..., to create teaching materials accessible to students with special needs?”). Respondents were given a 4-point Likert scale (1=not at all; 2=little; 3=quite; 4=very).

Teachers’ educational practices: The scale consists of 8 items and aims to measure how much a teacher, also thanks to digital resources, is able to use effective and innovative educational practices, both with regard the relational aspect, for example interact positively with students, and with regard the cognitive dimensions of teaching process, for example support students’

concentration, introduce the topics in an innovative way.

Respondents were given a 4-point Likert scale (1=not at all; 2=little; 3=quite; 4=very).

Perceived personal effectiveness in the school environment: [3] consists of 12 items that assess teachers' confidence in their ability to successfully manage the challenging situations they encounter in their professional activity, even with challenging students and circumstances (e.g., I can intervene quickly and effectively in cases of transgressive/deviant behavior). The teachers responded by rating how much they agreed or disagreed with each statement on a scale of 1 to 7 (1=strongly disagree; 7=strongly agree). Cronbach's alpha in our sample is .94.

Teacher Self-Efficacy Scale: [24] involves three subscales, student involvement, learning strategies and classroom management, measured using a 9-point Likert scale, for a total of 24 items. The tool is based on Bandura's Teachers Self Efficacy

Scale, to which authors have added several indicators concerning teachers' abilities, such as the ability to adapt the lesson to the individual needs of the pupils, to face learning difficulties, to motivate commitment and interest. Based on the three subscales it is possible to obtain a global score. Cronbach's alpha is .98.

Results and Discussion

Preliminary analyses

Before responding to the hypotheses, it was first necessary to calculate the factorial saturations and the reliability of the ad hoc scales. The factorial saturations were performed for each scale. The validity of the construct was verified, confirming the adequacy of the tools in measuring the underlying dimension.

Cronbach's alpha for digital skills scale is .91. (cfr: Table 1).

Cronbach's alpha for educational practices scale is .92. (cfr: Table 2).

Table 1: Factor saturations - Scale of digital skills.

	Factor
	1
Look for materials that can be used in classes.	0.622
look for innovative software to use in teaching	0.655
utilising the various features of the most often used software	0.807
Share a multimedia file with your classmates online.	0.78
Creating or changing a text file	0.758
Create or modify a graphic file	0.827
Create or modify a video file	0.752
Using digital resources to create materials that are accessible to students with disabilities	0.787
Participation in video conferences or streaming video lectures	0.653

Note: The 'Minimum Residual' mining method was used in conjunction with an 'Oblimin' rotation.

Table 2: Factorial saturations - Scale of teachers' educational practices.

	Factor
	1
Attract students' attention	0.817
Support concentration	0.789
Interact with colleagues	0.662
Interact with the class	0.811
Stimulate interest	0.832
Monitor delivery of tasks	0.686
Present the themes in an innovative way	0.757
Evaluate students	0.791

Note: The 'Minimum Residual' mining method was used in conjunction with an 'Oblimin' rotation.

Then, we proceed to compare pre-training and post-training measures using MANOVA.

Results of MANOVA highlighted significant differences between t1 and t2 with respect to digital skills ($F(1)=10.95$;

$p=.001$), educational practices ($F(1)=20.64$; $p<.001$), teachers' perceived personal effectiveness in the school context ($F(1)=28.65$; $p<.001$) and teacher Self-Efficacy in class management, students' involvement and learning strategies ($F(1)=15.16$; $p<.001$). Overall,

it is possible to notice a significant improvement between pre-training and post training measures (cfr. Figure 1) in all the constructs analyzed, thus all the hypotheses are confirmed (Figure 1).

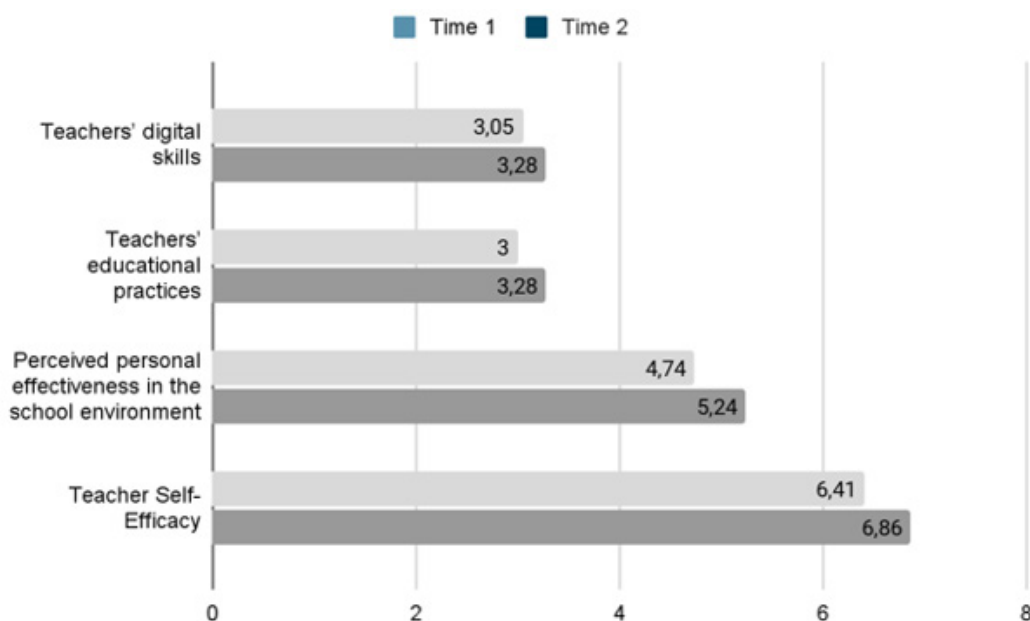


Figure 1: Average Scores of outcome variables.

Note: Teachers' digital skills range 1-4 (T1 = M_3.05, SD_0.54; T2 = M_3.28, SD_0.61); Teachers' educational practices range 1-4 (T1 = M_3.00, SD_0.54; T2 = M_3.28, SD_0.81); Perceived personal effectiveness in the school environment range 1-7 (T1 = M_4.74, SD_0.85; T2 = M_5.24, SD_0.88); Teacher Self-Efficacy range 1-9 (T1 = M_6.41, SD_1.09; T2 = M_6.63, SD_0.98).

Discussion and Conclusions

The aim of this study was evaluating the effectiveness of a training path addressed to teachers involved in a territorial project whose objective was to improve their professionalism with the final aim of combat educational poverty. This training, divided into specific modules, was aimed at promoting new teaching skills and practices. Thus, using a pre-post comparison design, we have measured teachers' digital skills, educational practices, as well teachers' self-efficacy, which were intended as outcome measures of the training path. Results show a significant improvement on all the dimensions examined: teachers seem to have more digital skills (H1), improved educational practices, which result updated both with regard to the relational (e.g., Interact with the class) and the cognitive dimension (e.g., support concentration) (H2), as well as their perception of self-efficacy as teacher, in the school and in the classroom context (H3). Overall, the study shows the effectiveness of training courses examined as tools to improve teachers' skills, practices, and self-efficacy.

Our data highlighted the usefulness of teachers' training paths as tools to innovate the school system, starting from the improvement of their competences. In particular, our study shows that it is possible to promote teachers' professionalism, both in terms of technical aspects, such as digital skills, and in terms of representational aspects, such as self-efficacy. Both of these dimensions are linked to the effectiveness of educational practices, which in turn should have a direct impact on students' learning.

The need for teacher creativity is a prominent theme in the literature, and one of the main recommendations for better teaching methods is to prepare students for the digital age [25]. In this regard, literature highlighted that teachers with little basic pedagogical knowledge and sufficient level of self-efficacy were not able to make sense of the use of the technologies learned in an integrated way [26]. On the contrary, technologically advanced environments, designed with reference to connective learning theories [27] and social learning theory [28] can positively influence teachers' ability to act flexibly promoting consequently effective learning [29]. Furthermore, a complex and cared for learning environment (which allows for faster and more articulated research, analysis, and information management) can create more opportunities for significant learning. Overall, this study suggests, according to literature [30] that an innovative learning environment can improve teachers' educational strategies and, as its effect, students' engagement, and learning.

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None.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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