Innovative aspects and evaluation methods in a teachers' continuous professional development training experience

Aspetti e metodi di valutazione innovativi in un'attività di formazione per lo sviluppo professionale continuo degli insegnanti

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HOW TO CITE Foschi, L. C. (2021). Innovative aspects and evaluation methods in a teachers' continuous professional development training experience. *Italian Journal of Educational Technology*, *29*(1), 46-64. doi: 10.17471/2499-4324/1165

ABSTRACT This paper analyses the innovative aspects and evaluation methods of a teachers' Continuous Professional Development training experience and examines the results obtained. After introducing the panorama in which Continuous Professional Development (CPD) takes place and highlighting the relevance it assumes in the Italian context, the paper describes the content and structural features of training, as well as provides a descriptive narrative of an activity example. The training is analysed according to areas and attributes of innovation, and key elements of effective teacher CPD. The training evaluation methods adopted, both traditional and innovative, are examined, and the results obtained discussed. The analyses carried out show that the training achieved encouragingly positive results.

KEYWORDS Teacher Professional Development; Continuous Professional Development; Training Innovation; In-Service Training; Teacher Education.

SOMMARIO Il presente contributo si propone di analizzare gli aspetti e i metodi di valutazione innovativi di un'attività di formazione per lo Sviluppo Professionale Continuo di insegnanti e di esaminarne i risultati ottenuti. Il contributo, dopo aver introdotto lo scenario in cui si posiziona lo Sviluppo Professionale Continuo ed evidenziato la rilevanza che quest'ultimo assume nel contesto italiano, presenta le caratteristiche di contenuto e di struttura della formazione, nonché descrive nel dettaglio un esempio di attività. La formazione viene analizzata in base alle aree e alle caratteristiche di innovazione e agli elementi chiave di un efficace Sviluppo Professionale Continuo rivolto agli insegnanti. Vengono esaminati i metodi di valutazione della formazione, sia tradizionali che innovativi, e discussi i risultati ottenuti. Le analisi effettuate mettono in luce come la formazione abbia conseguito risultati positivi incoraggianti.

PAROLE CHIAVE Sviluppo Professionale degli Insegnanti; Sviluppo Professionale Continuo; Innovazione della Formazione; Formazione in Servizio; Formazione degli Insegnanti.

1. INTRODUCTION

The role of teachers is considered universally decisive for the quality of education. Decades of research have shown that teachers largely determine the quality of instruction, which strongly affects students' learning and outcomes (Darling-Hammond, 2017; Barber & Mourshed, 2009; Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005; OECD, 2005, 2018; Rivkin, Hanushek, & Kain, 2005; Scheerens, 2000). Enhancing teacher quality, therefore, represents a priority at the policy level and a key factor in determining the success of the educational system (European Commission, 2007; OECD, 2005, 2019). The need to improve the quality of teacher education, both initial and in-service, and to promote the profession through measures that increase its social prestige and attractiveness is internationally identified as a primary education policy (OECD, 2005, 2019), especially in Europe (European Council, 2009a, 2017; European Commission, 2007). Within this scenario, the focus of this paper, *i.e.* Continuous Professional Development (CPD) or, in other words, in-service professional development, is recognised as a key factor in improving the quality of education and learning and a vital element of teacher professionalism (European Commission, 2005, 2013; European Council, 2009b, 2014; OECD, 2018, 2019; UNESCO, 2016; Vuorikari, 2019). The need for greater involvement in CPD is perceived not only at a "top" level, in international and national policies, but also at a "bottom" level, as teachers report a high need for CPD (OECD, 2014, 2019). This is especially true in Italy, where strengthening teacher CPD represents a challenge[1] (European Council, 2013; MIUR, 2016) and a need perceived by teachers (OECD, 2014, 2019). The need to strengthen CPD in Italy also derives from specific contextual conditions:

1) Teachers in Italy are on average older than in most other European and OECD countries (see OECD, 2019). In the school year 2017-2018, the average age of Italian teachers (from primary to upper secondary) was 51 years and 2 months (MIUR, 2019); furthermore 54% are 50 years or older, and 18% are 60 or older (Eurostat, 2018).
2) Italian teachers often have not received any initial training for teaching, obligatory since 1998. The latest TALIS[2] data (OECD, 2019), concerning lower secondary school teachers, show that, during their initial education, 64% of teachers in Italy were trained on subject content, pedagogy and classroom practice[3]. However, there is still a gap between the education or training teachers received and their sense of preparedness when they join the profession (cf., Tables I.4.13 and I.4.20, TALIS 2018 Database[4]) (OECD 2019).
3) Finally, the participation of Italian teachers in CPD activities has always been rather low. For example, TALIS 2013 (OECD, 2014[5]) showed that 75,4% (vs. 88,4%, average of participating countries) of lower secondary and 76% (vs. 90,7%, average of 10 OECD countries analysed) of upper secondary teachers had attended at least one CPD activity in the year prior to the survey.

These conditions have contributed to the recognition at the national policy level of the need to implement a system for teacher CPD. The recent "Good School" reform (Law n. 107, 13 July 2015) has made in-service training mandatory, permanent and structural, overcoming for the first time the generic reference to a teach-

[1] At the moment, Italy is on the right track (European Council, 2018, p. C 320/53): "Implementation of the school reform is broadly on track, and vocational education and training are improving."

[2] Teaching and Learning International Survey.

[3] A percentage that is still lower than the average of the other OECD countries and economies participating in TALIS 2018: 79%.

[4] https://doi.org/10.1787/888933933083

[5] Cf.,Tables 4.6 and 4.6.b TALIS 2013 Database: http://www.oecd.org/education/school/talis-excel-figures-and-tables.htm

ers' right/duty. The reform has already affected the percentages of Italian teachers who participated in CPD activities. Comparing the data from TALIS 2013 (OECD, 2014) with those of TALIS 2018 (OECD, 2019), significant improvements have been found. The percentage of Italian teachers attending CPD activities is currently almost at the level of other European and OECD countries: 93,2% of lower secondary teachers participated in at least one type of PD activity in the 12 months prior to the survey (*vs*. an arithmetic average of 94,3% and a weighted average of 92,5% across all EU Member State that participate in TALIS; and an average of 94,4% and 94,5% across respectively 48 and 31 TALIS and OECD countries and economies) (*cf*., Table I.5.1, TALIS 2018 Database[6]) (OECD 2019).

In conclusion, education systems are increasingly attaching importance to the quality and professionalism of their teachers. Investing in relevant, innovative, and effective CPD is therefore recognised as a key priority (see also Sustainable Development Goals in United Nations, 2015). However, international studies repeatedly find that only a small proportion of teachers participate in high-quality CPD activities (OECD, 2017). In addition, the issue of the ineffectiveness of CPD activities is often brought up as most of them have a traditional approach: tend to view teachers as passive recipients of knowledge; are too conventionally taught; have the formula of one-day, "drive by" seminar (Darling-Hammond, Hyler, & Gardner, 2017; OECD, 2019). In recent decades, a "new paradigm" for CPD has emerged from research that distinguishes powerful opportunities for CPD that can affect teachers' knowledge and practices (e.g., Darling-Hammond et al., 2017; Desimone, 2009; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). Traditional formats, such as courses, workshops, and seminars attended in person[7], frequently out of school, are therefore increasingly complemented with other forms of delivery, often combining different types of activities. Furthermore, regarding the structure of the latter, a variety of activities can also be seen in terms of time, place, and organisation (Vuorikari, 2018, 2019; Darling-Hammond et al., 2017; OECD, 2019). This paper analyses the innovative aspects and evaluation methods of a teachers' CPD training experience and examines the results obtained.

2. THE TRAINING

The training, conducted by the writer and another trainer and described below, took place at a private school in Bologna, spanned about a school year (September 2018-May 2019), and involved 45 teachers. In terms of levels of education, 33 were upper secondary teachers (Scientific High School and Applied Sciences or Sports option; Aeronautical Technical Institute), 7 were lower secondary teachers, and 5 were teachers of both levels. The age of the teachers ranged from 23 to 69 (M = 39,32; SD = 12,62), while the years of teaching experience ranged from 0 to 42 (M = 8; SD = 11,85). The teachers' subjects were: Math and Physics (17,78%); Italian and Latin (17,78%); English language (13,33%); History and Philosophy (8,89%); Sciences (8,89%); Physical education and Sports (6,67%); Law (4,44%); Technology (4,44%); Art history (2,22%); French language (2,22%); Spanish language (2,22%); Music (2,22%); Air navigation (2,22%); Catholic religion (2,22%); Computer science (2,22%); Geo-history (2,22%).

2.1. *Content features*

The training consisted of two parts: one focused on the educational use of digital technologies, the other on a learning-teaching approach inspired by Challenge Based Learning (Schwartz, Lin, Brophy, & Bransford,

[6] https://doi.org/10.1787/888933933102

[7] Attending courses and seminars in person is the most common forms of CPD across the OECD (76%) (OECD, 2019). This is especially true in Italy, where 81,2% of teachers participate in this kind of CPD activity (cf., Table I.5.7, TALIS 2018 Database in OECD, 2019. https://doi.org/10.1787/888933933102).

1999; O'Mahony et al., 2012)[8]. The first part concerned the designing and creation of digital educational artefacts with Learning Management Systems, as well as with cloud environments dedicated to the creation of digital education lessons, presentations, and videos. The second part concerned a learning-teaching cycle articulated in three phases: throwing down (Challenge), driving (Reply), and closing (Closing) the "challenge" (Cecchinato & Papa, 2016; Cecchinato, Papa, & Foschi, 2019). In brief, the Challenge phase aims to activate students' intellectual curiosity in order to involve and motivate them to learn; multiple strategies can be used, such as "cognitive dissonance", "cognitive conflict", and the inductive approach. In the Reply phase students are engaged in active learning (e.g., cooperative learning, debate, peer instruction, think-pair-share, guided reciprocal peer questioning) so they can, with teacher support, solve the challenge. Finally, a phase of re-elaboration and evaluation of what students have done in response to the challenge closes the cycle; assessment practices aimed at improving students' skills, restructuring and concluding the proposed activities can be implemented (e.g., assessment for and as learning, peer- and self-assessment).

2.2. *Structural features*

The training took place in a blended mode and consisted of five face-to-face meetings, conducted over the whole school year, taking place onsite in the school and lasting about 2/3 hours, and of six online modules via Moodle. In addition, at the end of the training, there was a period of practical hands-on experience where teachers implement and experiment in their classrooms with the Lesson Plans they have designed. Finally, an attempt was made to act in accordance with the learning-teaching approach proposed to teachers (i.e., congruent teaching; Swennen, Lunenberg, & Korthagen, 2008), by reproducing, in the training, teaching practices that were proposed in the training itself, *i.e.* engaging teachers in the same style of learning as the students would experience.

Regarding the first part of the training, each online module offered teachers learning opportunities in a paced mode (fixed start and end date), usually spanning 2-3 weeks. In each module, teachers were involved in the creation of digital educational artefacts according to a specific learning goal, and had access to different resources and activities, like video tutorials, files, pages, quizzes, activity guides, and examples of artefacts (not only concretely realised, but also narratively described in both educational and technical choices). Teachers could also rely on the support of the trainers and exchange ideas and suggestions with each other. At the end of each module, teachers submitted their artefacts in a forum, where they received formative feedback from one trainer.

The structure of the second part of the training is described in detail in the next paragraph.

2.3. *Descriptive narrative of an activity example*

The structure of the face-to-face meeting and online activities fulfilled during the Challenge phase module are detailed below[9].

2.3.1. *Face-to-face meeting*

During the face-to-face meeting, the first activity proposed to teachers was a challenge. Teachers were involved in an activity called "find the intruder": they were presented with six examples of "challenges" and they were asked to answer, through a Google Forms, the following multiple-choice question "What is

[8] In terms of the priorities indicated by MIUR (Italian Ministry of Education, University and Research) in the National Training Plan "2016-2019 Teacher Training Plan", those involved in this training were: Digital skills and new learning environments and Competence-based teaching and methodological innovation.

[9] The other two modules, on driving and closing the challenge, had a similar structure.

the intruder?" Since most of the teachers (29 - 76,3% - out of 40 respondents) provided the correct answer, an open discussion followed. The discussion focused on the elements that guided teachers to identify the intruder, the similarities shared by the "real" challenges, and the differences between the latter and the intruder (i.e., the non-challenge). The discussion brought out the key features of a challenge.
Later, teachers were involved in a more challenging activity: they were asked to sort four challenges based on their quality choosing from four alternative answers. The reasons underlying this activity were multiple. With regard to the four challenges, these were used as "exemplars", in the meaning of Sadler (1987) who describes exemplars as "*key examples chosen in a typical way of quality or competence*" (p. 200). A number of important reasons underpinned this choice. Different exemplars discussed with peers and trainers: allow to clarify the objectives and quality levels (Orsmond, Merry, & Reiling, 2002) and uncover what the range of quality indicators might be (Tai, Ajjawi, Boud, Dawson, & Panadero, 2018); promote the active involvement in the identification of criteria and their understanding (Bell, Mladenovic, & Price, 2013); provide opportunities to explain and reconsider one's own judgements, as well as offer a way of getting acquainted with the criteria (Carless & Chan, 2017); enable the development of an evolving sense of what good work looks like (Carless, Chan, To, Lo, & Barrett, 2018). Peer Instruction (PI; Mazur, 1997) instead inspired the nature of the question and answers, as the hypothesis was that an activity like the one outlined above could allow the use of the PI strategy. The question was a conceptual question like the one proposed by ConcepTest in PI, while the multiple-choice answers were designed so that incorrect answer choices were plausible and able to bring out any misconceptions. The first poll was correctly answered by 19 teachers out of a total of 39 respondents (48,7%), while the rest selected the other three alternatives (respectively: 41%, 5,1%, 5,1%). As the scenario was suitable for the PI process, *i.e.* correct answers between 30% and 70 %, then the peer discussion followed. At the end of the discussion, teachers were polled for their answers again. This second poll was correctly answered by 31 out of a total of 39 respondents (77,5%) respondents. Therefore, an open discussion followed, in which teachers featured the different quality nuances between the challenges and highlighted the assessment criteria.

2.3.2. *Online module*

The online module was structured as shown in the first column of Tables 4 and 5. At the end of the module, teachers designed their own challenge and submitted it to Peergrade[10] for the peer- and self-assessment process[11]. The activity on Peergrade was articulated into three phases: submission, review, and react. During the submission phase, teachers had to propose their challenge by filling out a document in which they had to detail, in addition to general information (e.g., school level), subject), the phase of throwing down the challenge (Challenge). During the review phase, teachers were asked to anonymously assess the challenges of three colleagues - assigned, as far as possible, based on subject knowledge - and an excellent example of a challenge prepared by trainers, as well as to self-assess their own challenge. Proposing an excellent example, as if it was a challenge submitted by peers, had different purposes. Given the framework which outlines that it is more important to give, compared to receive, feedback (Cho & MacArthur, 2011; Nicol, Thomson, & Breslin, 2014) and that, by assessing the work of others, one may benefit from taking a detached perspective to evaluate a work and then use insights to monitor their own work (Nicol et al., 2014). It can, therefore, be inferred that, if excellent examples embody the standard being aimed for (Sadler, 1989), thus

[10] Beyond the already highlighted potentialities and motivations underlying the choice to use Peergrade, and not the corresponding Moodle alternative, i.e. the Workshop (see Foschi, Cecchinato, & Say, 2019),it should be added that Peergrade allows combining ratings and feedback comments, whereas Moodle does not.

[11] For the reasons underlying the adoption of peer- and self-assessment in this context, see Foschi et al. (2019) and Foschi and Cecchinato (2019).

teachers have a valid standard by which to compare their own work, in analogous ways to those described by Orsmond et al. (2002) in relation to exemplars. At the same time, teachers, by benchmarking their work against that of an excellent example, may generate internal feedback or inner dialogue in analogous ways to those described by Nicol et al. (2014) in relation to peer review. The review phase, also available in preview during the submission phase, consisted of two parts: rating and feedback. The first part required that teachers provide ratings on three different criteria. The first two were aimed at investigating, on a 4-point scale, how much the challenge was characterised by its two main key elements (i.e., motivational mechanisms, induction); while the last criterion required teachers to rate the quality of the challenge by choosing between four alternatives (poor, fair, good, excellent). The second part asked teachers to provide feedback comments about the strengths, and what could improve the challenge and why. There was also a third optional open question regarding any additional comments, suggestions, or advice. The choice to ask teachers to provide both ratings and feedback comments is recommended by literature (e.g., Li et al., 2016; Nicol et al., 2014; Davies, 2006, 2009; Avery, 2014). Finally, during the reaction phase, teachers expressed their own thoughts regarding the "usefulness" of the received assessments.

3. ASPECTS OF INNOVATION

To analyse the innovative aspects of the CPD training described here the report Innovating Professional Development in Compulsory Education by Vuorikari (2019) and its accompanying Technical Report (Vuorikari, 2018) were taken into account as they analyse the innovative and emerging CPD practices of teaching professionals who work in compulsory education.

3.1. *Areas of innovation*

Regarding the areas in which innovation takes place in teacher CPD, the two reports use seven labels to describe and analyse the areas of innovation. The labels are not categorical, and a CPD experience can feature many of them. Of the seven areas identified, the training described in this paper could feature three of them: Re-inventing blended learning, Engaging learners in first-hand experiences, and Innovating online delivery.

3.1.1. *Re-inventing blended learning*

In addition to using a well-established concept of blended learning that combines online with face-to-face learning[12], the training also introduced a period of practical hands-on experience where teachers implement and experiment lesson plans in their classrooms. Moreover, after these classroom experimentation units, teachers participated in a face-to-face meeting in order to share, exchange, and reflect on experiences with peers and trainers.

3.1.2. *Engaging learners in first-hand experiences*

The training engaged teachers directly in the same style of learning as the students would experience, *i.e*. trying out activities first-hand. Teachers, indeed, engaged in first-hand experiences by taking up the challenge, solving (e.g. Peer Instruction) and closing it (e.g., peer- and self-assessment), as well as using Moodle and other digital technologies as students.

[12] However, although this type of blended learning is already well established in university or business training, the same cannot be said for the CPD context. For example, even in the last TALIS 2018 (OECD, 2019), this type of blended learning was not considered. Moreover, the latter was also the first time that the distinction between "courses/seminars attended in person" and "online courses/seminars" has been introduced in TALIS, since the previous survey TALIS 2013 (OECD, 2014) only considered a generic indication to "courses/workshops".

3.1.3. *Innovating online delivery*

In addition to offering teacher learning opportunities online in a paced mode (fixed start and end date), the training varied in the depth and/or length of the online contents or learning activities. Not only those that can be defined as short learning units were proposed, but also teachers did not necessarily have to use all the resources of the modules. Finally, training also used those that in the reports are described as innovative methods in online training, like digital artefacts designing, online facilitation by trainers, and peer-assessment.

3.2. *Attributes of innovation*

The reports, inspired by the five trajectories of innovation for education used by Bocconi, Kampylis, and Punie (2012), describe five attributes of innovation (first line of Table 1).

Nature of innovation	Implementation phase	Access level	Actors	Type of innovation
Radical	Pilot/Scale	Local	Multiple actors	Process

Table 1. Attributes of innovation of the training.

In terms of the nature of innovation (Leadbeater & Wong, 2010; OECD, 2010), the training could be considered as "radical" as it included a number of innovative elements in how teacher CPD is usually provided or understood. For example, it combined online content, activity, and interactions with face-to-face meetings, in addition to the practical hands-on experimentation in one's own classroom, as well as engaged learners in first-hand experiences.

In terms of the implementation phase (OECD, 2010), the training could be considered between "pilot" and "scale". The training could be considered at "scale" as its structure was similar to that of previous training experiences, i.e. there are already years of implementations with a rather consolidated up-take. However, the training outlined in this paper differed from previous experiences in some contents, resources and activities, i.e. it is the only training that has the exact same structure described here (pilot).

Regarding access level (OECD, 2010), the training was at the local level as it referred only to a restricted area.

In terms of actors of the CPD experience, the training focused on "multiple actors" within a school as it involved almost all of the school's teaching staff.

Finally, regarding the type of innovation, using the vocabulary of the Oslo Manual (OECD/Eurostat, 2018), the training mainly represented a process innovation in the field of CPD. It introduced a new delivery method combining online modules, face-to-face meetings, and hands-on experimentation onsite in school, and it attempted to affect teaching practices of teachers.

3.3. *Key elements of effective teacher CPD*

The two reports analyse the different CPD examples using the seven key elements that have been found to characterise effective teacher CPD by Darling-Hammond et al. (2017)[13], which emphasise how (p. 4) "*successful professional development models generally feature a number of these elements simultaneously*. […] *Other effective programs may possess most but not all of the seven features*."

[13] Similar results can be found in previous works (Garet, Porter, Desimone, Birman, & Yoon, 2001; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007; Timperley, Wilson, Barrar, & Fung, 2007; Darling-Hammond et al., 2009; Desimone, 2009; Desimone & Garet, 2015).

Is it content-focused (discipline-specific)?	Not strictly
Does it incorporate active learning?	Yes
Does it support collaboration in job-embedded contexts?	Some
Does it use models and modelling of effective practice?	Yes
Does it provide coaching and expert support?	Yes
Does it offer opportunities for feedback and reflection?	Yes
Is it of sustained duration?	Yes

Table 2. Key elements of effective teacher CPD underlying the analysis.

3.3.1. Content focus

The training focused on specific pedagogies that are not discipline-specific, therefore, although the training had a heavy focus on affecting teachers' classroom practices, there is no direct focus on a specific discipline or curriculum subject as understood in the work by Darling-Hammond *et al.* (2017)[14]: "*Content-focused PD generally treats discipline-specific curricula such as mathematics, science, or literacy*" (p. 5). Nevertheless, some training elements deal directly with this aspect. Firstly, the different examples proposed to teachers covered a variety of subjects and classroom topics both for lower and upper secondary education. Secondly, the effort made by teachers to create activities designed for their own subjects and students, as well as the practical hands-on experimentation that they did in their classrooms at the end of the training. Thirdly, the possibility offered to teachers to give and receive feedback from peers who teach in the same or a similar subject area. Therefore, even if there was not a focus on discipline-specific content-knowledge, the training had a heavy emphasis on how to apply it in educational practices with students.

3.3.2. Active learning

The training incorporated active learning for teachers as activities were contextualised and connected to classroom practices. Teachers were engaged in using and creating authentic artefacts and interactive activities. The training engaged teachers in designing and trying out new learning-teaching strategies, providing them with opportunities to engage in the same style of learning they would design for their students, as well as to experiment in their classroom.

3.3.3. *Collaboration*

Although the training did not explicitly support job-embedded collaboration with colleagues, some aspects of the training certainly promoted it. For example, small-group interactions during face-to-face activities, peer-assessment, and the fact that the training involved almost all of the school's teaching staff promoted the opportunity for teachers to share ideas and collaborate in their learning. In addition, feedback from a teacher at the end of the training, "*The training […] promotes discussion and the possibility to work in a*

[14] Otherwise, in the reports considered (Vuorikari, 2018, 2019), programs that focus on media literacy and digital competence are considered as content-focused, as well as programs that cover a variety of subjects and classroom topics for teachers at different grade levels.

team", reveals evidence of how the training could support collaboration with colleagues in a job-embedded context.

3.3.4. *Use of models and modelling*

The training, as it was conceived and structured, offered several opportunities for the use of models and modelling of effective practice. With regard to models, both in the first, but especially in the second half of the training, multiple examples of lesson plans, digital educational artefacts, samples of practices, and prototyping activities for different subjects and school levels were proposed to the teachers. With regard to modelling, there were numerous opportunities both online and face-to-face, as can be deduced from paragraphs 2.2 and 3.1.2, and especially from the activity example described in paragraph 2.3.

3.3.5. *Coaching and expert support*

In the training, there were features for providing coaching and expert support to participating teachers. To sustain teachers in the realisation of the activities, as well as to encourage them to reach the end of their learning experience successfully, several supporting elements were foreseen. Trainers had a support function as facilitators of face-to-face activities, and as remote tutors via Moodle. Throughout the training, expert support was always available "on-demand". In addition, peers also played a supporting role both online and face-to-face.

3.3.6. *Feedback and reflection*

In terms of getting feedback and opportunities to reflect on one's learning, several tools were employed. For example, in the first part of the training, teachers, after submitting their work, received ad-hoc, individualised, supportive, and constructive feedback, *i.e.* formative feedback that could help teachers to improve their work. While in the second part, the peer- assessment activities offered the opportunity to give and receive feedback and to reflect together with other teachers. The face-to-face meetings offered a space for teachers to think about practices that work and those that do not, as well as to receive input and opportunities for one's own reflection.

3.3.7. *Sustained duration*

The training stretched over a whole school year and was sustained over time through recurring engagement with online activities and face-to-face meetings, therefore offering teachers multiple opportunities to engage in learning, as well as the possibility of sustaining learning and practices over a long period.

4. TRAINING EVALUATION

This paragraph analyses some of the traditional and innovative methods used to evaluate the training and discusses the results obtained. In particular, the following aspects are examined:

- participation of teachers in the training;
- overall evaluation of the training, in terms of satisfaction, strengths, weaknesses, and suggestions;
- teachers' evaluation and creative skills in relation to the learning-teaching approach.

4.1. *Traditional methods*

4.1.1. *Participation*

The Moodle course included six modules made up of "activities" and "resources"[15]. In order to evaluate the participation of teachers in the training, only the activities carried out - therefore not the use of resources like video tutorials, documents, etc. - were taken into account. The total number of activities was sixteen. Online activities fully engaged (*i.e.*, an activity performance rate greater than or equal to 68,75%) 36 teachers out of a total of 45 teachers. The overall online activity performance rate is shown in Table 3. In summary, 80% of teachers carried out between 68,75% and 100% of the activities, 8,89% between 40,63% and 50%, while the remaining 11,11% performed between 15,63% and 34,38% of the activities.

Performed activities	100%	84,38%	71,88%	68,75%	50%	43,75%	40,63%	34,38%	15,63%
Number of teachers	30	3	1	2	2	1	1	3	2

Table 3. Overall online activity performance rate.

With regard to the specific participation in the activities of the Challenge phase module (Table 4), 82,22% of teachers took both quizzes, while 86,67% of them participated in both submission and review phases in Peergrade.

Name of activity	Type of activity	Teachers who carried out the activity	Performance rate
Challenge quizzes: lower/upper secondary	Quiz	37	82,22%
Quiz: Sort the following challenges	Quiz	37	82,22%
Design the challenge	Peergrade	39	86,67%
Assess peer challenges	Peergrade		
3/3		36	80%
2/3		3	6,67%
Assess the excellent example of a challenge	Peergrade	39	86,67%
Self-assess your own challenge	Peergrade	36	80%

Table 4. Activity performance rate of the Challenge phase module.

In addition, it is also possible, thanks to Moodle's learning analytics, and in particular through the "course participation" report, to calculate the participation, of each teacher, in the various resources of the different

[15] The distinction between activities and resources is used in the meaning proposed by Moodle.

modules. By merging the participation of individual teachers, it is possible to define the display rate of the various resources. An example, relating to the Challenge phase module, of the display rates of the various resources is shown in Table 5.

Name of resource	Type of resource	No. of teachers who displayed the resource	Display rate	Min no. of views	Max no. of views
Activity guide	Page	37	82,22%	1	11
Features of an excellent challenge	File	27	60%	1	5
Examples of challenges of different quality with ratings and comments	Folder	29	64,44%	1	7
Challenge design guidelines	File	28	62,22%	1	7
Example of challenges lower/upper secondary	Folder	34	75,56%	1	12
Introduction to Peergrade activities	Page	28	62,22%	1	10
Reasons underlying peer- and self-assessment	Page	22	48,89%	1	3
Peergrade	File	37	82,22%	1	24

Table 5. Resource display rate of the Challenge phase module.

4.1.2. *Overall evaluation*

At the end of the training, thirty-two teachers completed an anonymous survey. The survey covered several aspects of the training; only the overall evaluation is documeted here. With regard to the first question, *i.e.* satisfaction with the training, about two-thirds of the teachers were somewhat satisfied, while about a third of them were very or extremely satisfied, none of the teachers were not very, or not at all, satisfied, as shown in Figure 1.

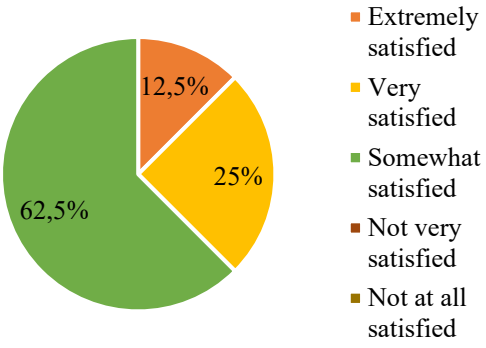

Figure 1. Satisfaction with the training.

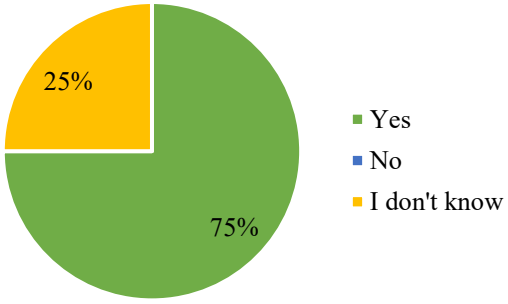

Figure 2. Answers to "*Would you recommend the training to other teachers?*"

The second question asked teachers if they would recommend the training to other teachers (Figure 2), while the third question asked them the reasons behind their responses. Four, out of the eight teachers who answered "I don't know", reported that it depends on the type of school in which one teaches; one teacher reported that it is really demanding in terms of time; one would recommend some parts of the training while others not; one reported that what training had proposed was not very different from the way they taught; and one that the training did not make significant improvements to their teaching. Otherwise, of the twenty-four teachers who said yes, nine said that the training could help teachers open their minds and reflect, review and expand their teaching; similarly, eight teachers would recommend the training because it enriches, offers new ideas and promotes discussion, as well as because they learned a lot and find it interesting to improve and question themselves; four found the training useful, formative, and well structured; two because it allowed them to understand their students' needs better; one because it can be useful to those who are not familiar with the progress of pedagogy.

The fourth question (optional) sought to identify the most fruitful aspects of the training. Out of the twenty-one teachers who answered this question, seven mentioned aspects that can be attributed to the second half of the training, that is, concerning the learning-teaching cycle; six mentioned aspects that can be attributed to the first half of the training, that is, concerning the educational use of digital technologies; three mentioned aspects of both the first and second half of the training; five mentioned general aspects such as questioning oneself or the peer-assessment activities.

The last question (optional) sought information on aspects that could be improved. Out of the twenty-one teachers who answered this question, five said "none"; four mentioned the high workload, and another teacher suggested that it could be an intensive training course during a sabbatical month; three suggested an increase in the number of simulations as "student" and to add simulations, during the face-to-face meetings, as "teacher"; two mentioned personalising the training paths according to the subject areas and one to develop them differently for people with TFA or without TFA[16]; two mentioned making better use of the online training; two mentioned the disparity between the teachers in terms of mastering the ICT tools; one teacher expressed how they, as a student, did not always like the proposed approach.

[16] TFA means Active - Formative - Traineeship, i.e. the postgraduate course aimed at qualifying for teaching in Italian secondary schools.

4.2. Innovative methods

The peer-assessment activities, which represented a core integral part of the training and primarily had educational purposes, were also used as a training evaluation method. In particular, by way of example, the peer-assessment activity - described in detail in paragraph 2.3.2 - can be considered.

The assessments provided by teachers to the challenge prepared by trainers can be used to examine whether teachers are able to recognise the excellent quality of a challenge and to assess it accordingly in terms of both ratings and feedback comments. The fact that teachers are able to recognise the challenge as excellent can lead to infer that they have understood which features an excellent challenge has, they know how to recognise them and to assess them properly. Moreover, if teachers recognise the excellent quality of a challenge, then it can be argued that they show good evaluation skills in relation to the learning-teaching approach, in analogous ways to those described in relation to the agreement between trainers' and teachers' assessments (Foschi & Cecchinato, 2019; Foschi et al., 2019). Of the thirty-nine teachers who assessed the challenge proposed by trainers, thirty-two indicated "Excellent" quality, six indicated "Good" quality, one teacher indicated "Fair", while none indicated "Poor" quality as shown in Figure 3.

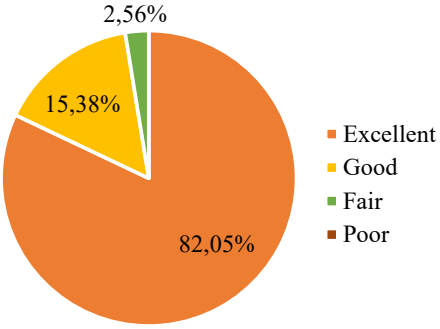

Figure 3. Quality indicated by teachers for the challenge proposed by trainers (excellent example).

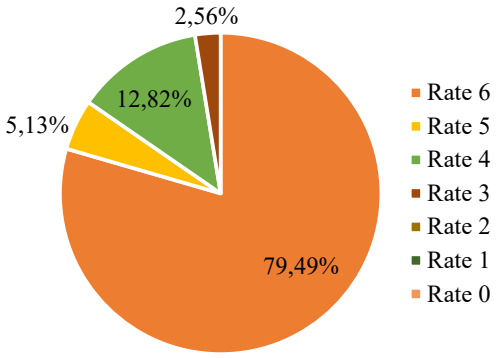

Figure 4. Ratings attributed by teachers for the challenge proposed by trainers (excellent example).

With regard to rating scores, since they referred to two criteria and were based on a 4-point scale from 0 (min) to 3 (max), ratings could vary between a minimum of 0 and a maximum of 6. Of the thirty-nine teachers who assessed the challenge, thirty-one rated the maximum (6), two rated the challenge 5, five rated it 4, and only one rated it 3 as shown in Figure 4. Almost all of the teachers who indicated "Excellent" quality rated the maximum (6), except for two who rated the challenge 5 and one who rated it 4. Otherwise, two of the teachers who indicated "Good" quality gave the maximum (6); the other teachers who indicated "Good" quality rated the challenge 4. Finally, the teacher who indicated "Poor" quality rated it 3. In summary, except for the latter teacher, all the teachers gave positive or very positive ratings. In addition, however, those who indicated "Good" quality, as well as the teacher who indicated "Poor", did not report any critical issues in the feedback comments.

Furthermore, having already highlighted (Foschi & Cecchinato, 2019; Foschi et al., 2019) the validity and reliability of peer-assessment in the context of teacher CPD, it is possible to consider the ratings provided by teachers in the same way as those of the trainers. The ratings received from teachers' challenges based on peer assessments can, therefore, be used to examine whether or not the teachers have shown, in addition

to good evaluation skills, creative skills in relation to the learning-teaching approach. Since each challenge, except three, received three peer ratings, the quality rating was weighted. For example, if a challenge received three "Fair", or "Poor", "Fair" and "Good", or two "Fair" and one "Good", it was considered of fair quality, while if it received two "Good" and one "Excellent", it was considered of good-excellent quality, etc.. The quality ratings received from the challenges are shown in Figure 5. Almost half of the challenges resulted in good quality, almost a third resulted in fair-good or fair quality, while a fifth resulted in good-excellent or excellent quality.

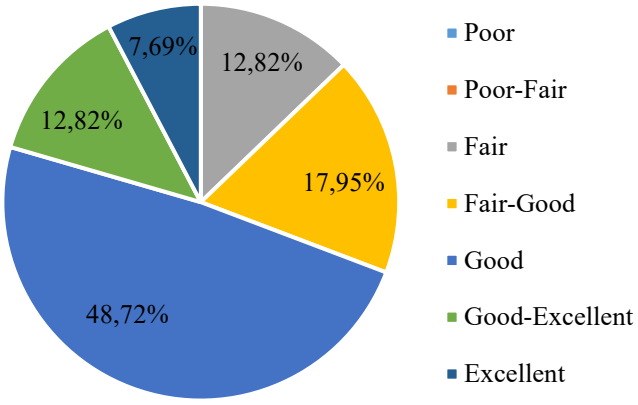

Figure 5. Quality ratings of teachers' challenges.

5. DISCUSSION

The training showed a good participation rate. This is especially true considering the high workload required from teachers, and that creating educational activities inspired by the proposed approach is challenging for teachers. It should also be noted that, in order to evaluate the participation of teachers, only the activities carried out were analysed (*i.e.* activity performance rate), while neither participation in face-to-face meetings nor the use of resources in Moodle were taken into account. Although considering the participation rate, as a method to evaluate what was done, who participated and to what extent, is very common, it is not so common to calculate it as described here. Requiring teachers to carry out activities and taking these into account allows the trainers to consider their real active participation.

In addition, the training showed a good overall evaluation. Teachers were from somewhat to extremely satisfied with the training, most of them stated that they would recommend the training, and the answers to the open questions were very positive and interesting. Nevertheless, these forms of evaluation have some weaknesses. They can cost to response rates and therefore the possibility of obtaining the opinions of all the teachers who participated in the training; they are not an integral part of the training, but rather additional requests that require teachers to do other activities; they are considered by some educators, especially satisfaction, as "happiness quotients" as they indicate only the favourable value of an activity, not its worth or quality (Guskey, 2002; Guskey, Roy, & von Frank, 2014). Although teachers reactions to the training, like those analysed in this paper, can be conceptualised as impacts of CPD (see Guskey, 2002; Guskey et al., 2014; King, 2014), considering only this form of impact provides an incomplete picture that excludes knowledge and skills evaluations.

A way that is often used to evaluate the knowledge/skills of the participants is the end-of-module or course quizzes. This paper highlights not only how in this training the quizzes were not proposed for evaluation

purposes, but, for example, to bring out previous knowledge or to stimulate inductive reasoning, but also how different solutions can be considered to evaluate the knowledge and skills of the teachers participating in the training. These forms of evaluation have the advantage, *inter alia*, of being an integral part of the training, therefore they do not require teachers to do additional activities. Peer-assessment activities, for example, allow us to not only build the training evaluation within the training itself, but also to have on-going formative evaluations, as well as forms of summative evaluation. They further allow us to make inferences about the knowledge and skills of the teachers participating in the training. The fact that almost all the teachers managed to recognise the excellent quality of the challenge proposed by trainers, as well as the fact that most of the teachers produced good quality challenges, allows us to argue that the teachers involved in the training showed good creative and evaluation skills in relation to the learning-teaching approach. Although it cannot be concluded, lacking pre- and post-training analyses, that teachers have developed these skills thanks to the training, it can, however, be deduced that these results represent an indicator of the good ability to create and evaluate what was proposed in the training. These skills, *i.e.* to evaluate and create, are considered high-level skills (Anderson et al., 2001; Krathwohl, 2002). In conclusion, the analyses proposed here, in addition to other analyses, can enrich the training evaluation processes.

6. CONCLUSIONS

Teacher CPD has become an important component of educational policies for improving the quality of education and learning in schools. At the same time, it represents a need perceived by teachers. However, international studies repeatedly find that only a small portion of teachers participate in high-quality CPD activities. In recent decades, therefore, a "new paradigm" for CPD has emerged from the research. Within this scenario, the teachers' CPD training experience described in this paper was analysed focusing on its innovative aspects. Areas and attributes of innovation, as well as key elements of effective teacher CPD, were analysed. The paper also highlighted some innovative solutions that can enrich the training evaluation processes. In addition, both traditional and innovative methods used to evaluate the training were analysed, and their results discussed. In conclusion, the training is well-positioned within innovative proposals for teacher CPD and shows encouraging positive results.

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