The assessment practices used by teachers before and after the experience of Distance Learning

Le pratiche di valutazione utilizzate dai docenti prima e dopo l'esperienza della Didattica a Distanza

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ABSTRACT Distance Learning (DL) introduced due to the health emergency has imposed a total and complex reorganization of schools, renewing the debate on the role of technologies in teaching. Among the actors directly involved in the school readjustment are certainly teachers, who have had to deal with teaching and assessment tools and methods different from their usual practices. This study, as part of a broader research project carried out for a doctoral thesis, delves into the experience lived by teachers during DL with particular reference to the use of ttechnologies and the assessment of learning. This paper presents the results that emerged from the compilation of a questionnaire, administered to 423 teachers participating in the training course *INVALSI tests and data literacy: towards skills-based teaching*, aimed at deepening the assessment practices used following the DL experience and the difficulties encountered by teachers in assessing learning.

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[1] The opinions and views expressed in this article are those of the author and do not necessarily reflect the official policy or position of INVALSI.

KEYWORDS Formative Assessment; Distance Learning; Information Communication Technologies; Teachers; Technology-Enhanced Assessment.

SOMMARIO La Didattica a Distanza (DaD) introdotta a causa dell'emergenza sanitaria ha imposto una totale e complessa riorganizzazione delle scuole rinnovando il dibattito sul ruolo delle tecnologie nella didattica. Tra gli attori direttamente coinvolti nel riadattamento scolastico ci sono sicuramente gli insegnanti, i quali hanno dovuto fare i conti con strumenti e modalità didattiche e valutative diversi dalle loro pratiche abituali. Questo studio, nell'ambito di un più ampio progetto di ricerca realizzato per una tesi di dottorato, approfondisce l'esperienza vissuta dai docenti durante la DaD con particolare riferimento all'utilizzo delle tecnologie e alla valutazione degli apprendimenti. Questo contributo presenta i risultati emersi dalla compilazione di un questionario, somministrato a 423 insegnanti partecipanti al percorso formativo *Prove INVALSI e data literacy: verso una didattica per competenze*, finalizzato ad approfondire le pratiche di valutazione utilizzate in seguito all'esperienza della DaD e alle difficoltà riscontrate dagli insegnanti per la valutazione degli apprendimenti.

PAROLE CHIAVE Valutazione Formativa; Didattica a Distanza; Tecnologie dell'Informazione e della Comunicazione; Docenti; Valutazione Potenziata dalla Tecnologia.

1. Introduction

The health emergency caused by the spread of SARS-CoV-2 has forced the closure of schools of all levels and the transition to "forced distance" teaching (Trinchero, 2020). This condition has required teachers to quickly identify and activate alternative teaching methods to traditional ones and, consequently, also to rethink assessment practices and methods. Although the concept of Distance Learning (DL) is not a totally new concept and over the years many authors have studied in depth the methods and approaches to assessment in online learning environments (Bruschi & Ercole, 2005; Cantoni et al., 2007; Calvani et al., 2010; Limone, 2012; Trinchero, 2018; Grion et al., 2018), the unexpected situation of DL in Italians schools, led teachers to adopt different teaching methods sometimes without adequate awareness of their methodological implications and of the specific nature of assessment in this specific context (Ranieri, 2020; Baldassarre et al., 2020; Galanti, 2021). Learning assessment has always been one of the weak points of the italian school system (Domenici, 1993; Vertecchi, 2003; Viganò, 2017). Furthermore, during DL the condition has particularly suffered from the teachers' unfamiliarity with technologies for teaching and assessment.

Without a doubt, DL has contributed to bringing out more clearly the critical issues of the purely transmissive teaching practice (Trinchero, 2020) and the inadequacy of the traditional concept of assessment, highlighting the weak evaluation culture possessed by teachers (Broadfoot, 2008), still very much tied to the measurable and summative purpose of evaluation (Perla et al., 2020). In fact, the student's assessment on DL has put teachers in front of the pressing need to give importance to new aspects very often neglected in the usual teaching practice in presence. Among these, for example, problem solving, flexibility, soft skills,

personal development, creativity, cooperation, communication, learning strategies, sense of responsibility, use of technologies, etc. Moving away from a representation of DL as a mere transposition online of traditional teaching practices, assessment in this framework should also be innovative by favoring innovative training methods. In this perspective, ICT can represent facilitators in creating learning contexts favorable to formative assessment processes (Devedzic & Devedzic, 2019).

Considering that very often the most innovative and effective solutions derive from the need to overcome a problem (Resnick, 2017), the present work aims to deepen how the constraints of DL have pushed and supported the motivation of teachers to consider creative solutions for teaching and assessment.

2. The potential of ICT in the formative assessment

Several authors state that technologies offer the possibility of implementing authentic activities that involve cognitive activation through formative assessment practices (Earl, 2012; Trinchero, 2018; Giannandrea & Winstone, 2024). The term cognitive activation refers to the students' recovery and use of their cognitive resources to assign meaning to informations encountered in their new learning experiences (Andre, 1997; Merrill, 2002; Trinchero, 2017). Technology offers the possibility to implement authentic activities involving cognitive activation through formative assessment (Earl, 2012). A key feature of formative assessment is the possibility to stimulate a self-regulated learning process, where the student is guided to activate resources consistent with the required task, choose the most appropriate resources to resolve the problematic situations and monitor and review the actions undertaken (Earl, 2012; Trinchero, 2018). From this perspective, technologies represent an important tool to help students self-regulate their learning processes, thus promoting the competence of learning to learn. Compared to traditional paper tests, the digital format would greatly expand the training potential thanks to the possibility of putting into play simulations, real-life situations, interactivity, problem solving, etc. Resuming the thought of Perkins (1985), which although dated is still very current, a limited use of ICT to distribute teaching materials, to support presentations, to transmit information and/or as more or less playful moments linked to moments of traditional teaching is not enough. In fact, learning strongly depends on the specific cognitive activity that the student carries out in front of a software, on the type of instructions to which he must respond, on the type of cognitive and social interaction in which he is directly involved and on the possibility of exploiting the cognitive potential that ICT offers (Perkins, 1985; Trinchero, 2018. The variable that seems to significantly affect student performance is the possibility offered by digital assessment to provide immediate and continuous feedback. Studies by Hattie and Timperley (2007) highlight that the most effective forms of feedback for students are video, audio or computer-assisted educational feedback, specifically related to learning objectives. The authors concluded that technology-assisted feedback is a powerful tool to support self-regulation and is effective in promoting greater student engagement in the task at hand (Hattie &Timperley, 2007). In fact, thanks to immediate and continuous feedback, students can identify errors and have the opportunity to make new attempts to arrive, autonomously, at the correct answer (Blok et al., 2002; Timmermann & Kruepke 2006). This allows students to be motivated, skilled and actively involved in a positive learning process. Another positive aspect is determined by the possibility offered by ICT to stimulate positive dynamics of group interaction (Trinchero, 2018). In fact, thanks to ICT it is possible to implement collaborative and cooperative teaching methodologies. In the socio-cultural approach, interaction is considered fundamental for the co-construction of knowledge in

learning processes (Wegerif, 2006). Taking up the theories of situated learning, comparison with peers represents an important resource for learning and training, since in dialogue, thought has the opportunity to emerge more clearly and discussion proves to be a formative resource both at a personal and group level (Schön & Argyris, 1996). The acquisition of skills in informal contexts, in fact, is considered an integral and essential part in carrying out significant activities in specific communities of practice (Wenger, 1998; Zucchermaglio & Saglietti, 2012). In general, ICT in teaching can play a fundamental role in promoting a more integrated approach to assessment. Nowadays, it is important for educational organizations to overcome a limited and traditional vision of assessment and to progressively orient themselves towards a spectrum of broader assessment practices. Among these we can include the use of ICT in assessment as useful tools to promote approaches that are student-centred, personalised, authentic, integrated and meaningful and that take into account knowledge and skills acquired in formal, non-formal and informal learning contexts.

3. The research background, objectives and methodology

3.1. 3.1 Study aims and research questions

This work is part of a broader research project carried out for a doctoral thesis that concerned the use of technology in teaching and digital assessment of learning in the theoretical framework of Technology Enhanced Learning (TEL), and more specifically on the teachers' use of technologies for teaching. The research was carried out in a specific context that consisted of a teachers group from the Liguria region who took part in the training course "INVALSI tests and data literacy: towards skills-based teaching" organized by Rete Interambito Liguria. The research took place in the emergency period characterized by the spread of SARS-CoV-2 and the closure of schools; therefore, the research focuses on the condition of DL and Integrated Digital Teaching (IDT). Therefore, the general objective of the project is to explore how technology has been used by teachers in educational-didactic practices and in particular in student assessment practices during DL and IDT. Furthermore, through the exploration of teachers' experiences, it is intended to highlight the positive aspects, the most successful ones and the critical aspects to outline possible perspectives for future reflection. For the work, an exploratory research design was applied with a mixed method (Johnson & Onwuegbuzie, 2004; Teddlie & Tasakkori, 2009; Montalbetti & Rappetti, 2015) based on an explanatory sequential approach (Creswell & Plano Clark, 2011), carried out through a strong interdisciplinarity between psychological, pedagogical and social fields. Overall, the research was structured into three separate studies: a first quantitative investigation with the administration of an online questionnaire to a large number of teachers; two other qualitative investigations follow with the administration of semi-structured interviews and focus groups with the aim of investigating in depth, within a specific educational context, the experiences and practices of a numerically small group of teachers (Semeraro, 2014). Here we will focus on the results that emerged in the quantitative phase with the aim of answering the following research questions:

What assessment practices were used by teachers before and after the DL introduction? Are there differences with respect to the school grade and the subject taught?

What difficulties did teachers encounter in assessing students? Are there differences with respect to the school grade and the subject taught?

Method, data collection and participants

For the quantitative research phase, in consideration of the size of the sample, in the period between November 2020 and January 2021, an online questionnaire was administered to all

teachers participating in the training course. A specific section has been prepared within a larger questionnaire structured overall into 5 sections for a total of 27 questions.

Here we will examine data relating to the teachers' responses in the section relating to assessment practices which, more specifically, are intended to explore the assessment practices used by teachers before and after the introduction of the DL and IDT and the difficulties found by teachers for student assessment. For the analysis of the assessment practices used by teachers before the introduction of the Prime Ministerial Decree of March 2020 which introduced DL, a question was proposed in the questionnaire composed into 22 items on an ordinal scale, which asked teachers to indicate the assessment practices used. Teachers could express the frequency of use on a scale of 4 steps ranging from "Never", "Sporadically", "Weekly" to "Daily".

As regards the question concerning assessment practices, the construction process involved a qualitative investigation, conducted through a semi-structured interview addressed to 6 teachers with the aim of collecting the assessment practices used and/or known in their daily practice.

To explore the difficulties encountered by teachers in assessing students during the DL a question was examined which asked teachers to indicate the level of difficulty encountered with respect to some aspects relating to assessment. The question, divided into 14 items on an ordinal scale, asked teachers to indicate the level of difficulty encountered on a 4-step scale from "A lot", "Quite a bit", "A little" and "Not at all". The items were drafted drawing inspiration from the actions that make up the evaluative process of learning proposed by Castoldi (2015). The author, taking up the thought of Barbier (1989), defines the evaluation process as a double representation process, whose starting point consists of a factual representation of an object and the arrival point of a codified representation of this same object. The evaluation process is therefore composed of the following actions:
- • Identification of the object (what to evaluate?);
- • data collection (how to evaluate? with which tools?);
- • definition of criteria (on what basis to evaluate? when to evaluate?);
- • expression of judgment (which evaluation code?);
- • regulation of teaching (which internal use? how to interpret the
- results?);
- • communication judgment (what external use? How to return the results?).

Furthermore, the section on teachers' personal and general information was analyzed.

Different data analysis models were applied in line with the research objectives: descriptive and exploratory analyses were done. The requirements necessary for the application of factor analysis were verified through the Kaiser-Meyer-Olkin (KMO; Kaiser, 1970) sampling adequacy test and the Bartlett's test of sphericity (Bartlett, 1954). The KMO analysis showed an index > 0.7, therefore in the range of values considered good (Kaiser & Rice, 1974). The Bartlett's Sphericity test highlighted a p value <0.05 and indicates a significant correlation between the variables.

An exploratory factor analysis[2] was applied, to identify the latent factors that were interpreted in terms of assessment models used by teachers before and after the introduction of DL. To assess stability/change regarding the assessment models used, a convergence analysis of the factor structures was carried out, comparing the recovered factors in terms of similarity through the Tucker congruence coefficient (Tucker, 1951; Chico et al., 2003; Goldberg, 1990;

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[2] with the extraction method of the principal axis factorisation and the varimax rotation method with Kaiser normalization.

Lorenzo Seva & Ten Berge, 2006). To verify the differences in terms of assessment practices with respect to the subject taught and the school grade before and after the introduction of DL, a univariate analysis of variance was applied to the factorial regression scores obtained. In this case, for each factorial dimension the regression scores of each subject in each factor were analyzed in relation to grade and subject. With respect to the difficulties encountered by teachers in assessing students, in this case too, an exploratory factorial analysis was carried out[3] to identify the latent factors. In order to verify the differences in terms of difficulties encountered by teachers with respect to the subject taught and the school grade, a post-hoc univariate analysis of variance was applied.

With reference to the participants, the questionnaire was addressed to all teachers participating in the training course "INVALSI Tests and Data Literacy" organized by Rete Interambito Liguria. Out of a total of 674 teachers, a response rate of 62.8% was achieved with 423 teachers who completed the questionnaire. Of the teachers' respondents, 26.7% work in primary school, 40.4% in lower secondary school and 32.9% in upper secondary school (Table 1).

Table 1. Frequency distribution and percentage of teachers who filled out the questionnaire by school level.

	A.V.	%
Primary school	113	26,7
Lower secondary school	171	40,4
Upper secondary school	139	32,9
Total	423	100

With regard to subject matter (Table 2), in primary school 14% of the responding teachers teach Italian, 13.7% teach Mathematics and another 13.7% teach English. Of these, 17.4% said they teach more than one subject. In lower secondary school, 13.5% of the responding teachers teach Italian, 17.3% teach Mathematics and 9.5% teach English. Of these, 5.2% said they teach more than one subject. In upper secondary school, 9.5% of the responding teachers teach Italian, 13.7% teach Mathematics and 9.5% teach English. Of these, 4.7% said they teach more than one subject. In general, the greatest number of teachers teach Mathematics. In lower secondary school, the highest number of teachers teach more than one subject and of teachers teach both Mathematics and Italian and English. With regard to gender, the teaching staff is strongly feminized. The percentage of male teachers increases with the increase in school level, reaching 17.3% in secondary schools.

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[3] with the extraction method of the principal axis factorization and the varimax rotation method with Kaiser normalization.

Table 2. Frequency distribution and percentage of questionnaire responses by school level and teacher discipline.

School level	Subject	A.V.*	%
Primary school	Italian	59	14
	Mathematics	58	13,7
	English	58	13,7
	other	4	0,9
	more disciplines	74	17,4
Lower secondary school	Italian	57	13,5
	Mathematics	73	17,3
	English	40	9,5
	other	3	0,7
	more disciplines	22	5,2
Upper secondary school	Italian	40	9,5
	Mathematics	58	13,7
	English	40	9,5
	other	1	0,2
	more disciplines	20	4,7

The sum of all values exceeds the total number of teachers responding to the questionnaire because some teachers declare that they teach multiple disciplines.

With regard to the age of teachers, the largest percentage of respondents is concentrated in the 51-60 age group (48.2%), followed by the 41-50 age group (27%) and the over-sixties (11.5%); teachers between 31 and 40 years old are 5.5%, while those under 30 represent only 1.3%. The average age of the sample is 52.

With regard to professional experience, teachers have on average previous professional experience of approximately 22 years. In general, it can be said that the sample is characterized by a high level of professional experience as 78.5% of teachers have professional experience of more than 10 years. Although this is a convenience sample and therefore not representative, it is important to highlight that there are some aspects in common with the reference population such as, for example, the prevalent presence of the female gender, the average age of teachers and the high professional experience.

4. Results

4.1. The assessment practices used by teachers before and after DL introduction

The exploratory factor analysis allowed us to identify 5 factors that explain 54.51% of the total variance interpretable with different assessment methodologies (Table 3).

Specifically, the first factor that explains 29.52% of the total variance presents high saturation values (ranging from .46 to .73) in correspondence with seven items that recall assessment methodologies and practices that refer to the use of Observational tools. The second factor includes five items with an explained variance of 7.94%. The items (with saturation levels from .41 to .80) refer to methodology and practices that are based on the evaluation of products created by students. The third factor reports high saturations on four items (with an explained variance of 6.53%) and refers to authentic evaluation methods and practices. The fourth factor includes two items that explain 5.50% of the variance and with saturation >.60 that refer to the

use of the student portfolio as an evaluation practice. The fifth factor, which explains 4.98% of the variance, includes four items (with saturation levels from .41 to .75) that refer to Structured and semi-structured assessment practices.

Table 3. Item saturation for Factors identified by exploratory factor analysis (assessment practices used by teachers before the introduction of the Prime Ministerial Decree).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Peer assessment	.731				
Student self-assessment	.720				
Role Playing	.668				
Group discussion	.566				
On-bord diary and/or collection of anecdotal episodes	.495				
Assessment rubrics	.478				
Observation (check list, grids, scales etc.)	.465				
Presentation in PowerPoint		.804			
In-depth thesis on the web		.746			
Products created in groups based on specific tasks (e.g. essay, presentation)		.615			
Audio and/or video		.608			
Computer-based testing on specific software (exercises and/or questions, true/false test, multiple choice, text completion, matching)		.415			
Analysis of problems and/or specific cases			.662		
Oral interview and/or spoken reflection			.660		
Case study and/or real-world task			.532		
Construction of concept maps			.420		
Student Digital Portfolio				.744	
Student Portfolio				.661	
Interview with structured questions					.753
Written test structured with exercises and/or questions (test with true/false items, multiple choice, text completion, correspondence)					.720
Free writing of texts (themes, summaries, reports, translations, etc.)					.441
Semi-structured written test (writing reports based on an outline, carrying out research activities in reference to defined criteria, short essays, etc.)					.412

For the analysis of the assessment practices used by teachers after the introduction of the Prime Ministerial Decree of March 2020 which introduced DL, as for the previous one, the question is divided into 22 items on an ordinal scale and asks teachers to indicate the assessment practices used after the DL introduction. The same response scale was proposed to the teachers. In this case, the exploratory factor analysis made it possible to identify 5 factors that explain 58.15% of the total variance that can be interpreted with different assessment methodologies but with repercussions of the items on different factors compared to the previous one (Table 4). The exploratory factor analysis allowed us to identify 5 factors that explain 58.15% of the total variance interpretable with different assessment methodologies. Specifically, the first factor explains 33.50% of the total variance presents high saturation values (ranging from .52 to .75) in correspondence with seven items that recall assessment methodologies and practices that refer to the use of Observational tools. The second factor includes four items with an explained

variance of 7.49%. The items (with saturation levels from .46 to .82) refer to assessment methodologies and practices that refer to products made by students. The third factor reports high saturations on four items with an explained variance of 7.08% (with saturation levels from .60 to .75) and refers to authentic evaluation methods and practices. The fourth factor includes two items that explain 5.18% of the variance and with saturation levels from .39 to .75 that refer to the use of the student portfolio as an assessment practice. The fifth factor, which explains 4.9% of the variance, includes four items (with saturation levels from .40 to .80) that refer to Structured and semi-structured assessment practices.

Table 4. Item saturation for Factors identified by exploratory factor analysis **(**assessment practices used by teachers after the introduction of the Prime Ministerial Decree**).**

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Student Portfolio	.744				
Student Digital Portfolio	.730				
On-bord diary and/or collection of anecdotal episodes	.671				
Assessment rubrics	.608				
Observation (check list, grids, scales etc.)	.572				
Peer assessment	.549				
Role Playing	.519				
Presentation in PowerPoint		.823			
Audio and/or video		.699			
In-depth thesis on the web		.675	.		
Free writing of texts (themes, summaries, reports, translations, etc.)		.455			
Oral interview and/or spoken reflection			.745		
Group discussion			.731		
Student self-assessment			.600		
Analysis of problems and/or specific cases				.745	
Case study and/or real-world task				.662	
Products created in groups based on specific tasks (e.g. essay, presentation)				.493	
Construction of concept maps				.387	
Written test structured with exercises and/or questions (test with true/false items, multiple choice, text completion, correspondence)					.804
Semi-structured written test (writing reports based on an outline, carrying out research activities in reference to defined criteria, short essays, etc.)					.575
Computer-based testing on specific software (exercises and/or questions, true/false test, multiple choice, text completion, matching)					.480
Interview with structured questions					.404

The comparison between the two sets of factors performed through the Tucker coefficient highlighted that 3 of the 5 factors extracted in each factor analysis (pre and post DL introduction) are stable, with values of 0.85 for factor 1, 0.96 for factor 2 and 0.86 for factor 5. Differently, factors 3 and 4 show poor congruence, highlighting values of 0.71 and 0.55 respectively (Table 5).

Table 5. Tucker congruence coefficient comparing factors

Factor	Tucker index[4]
1	0,853
2	0,961
3	0,715
4	0,555
5	0,862

With regard to the situation following the introduction of DL, from the analysis of the ANOVA test it is possible to see that there are statistically significant differences (value <0.05) on the third, fourth and fifth factors with respect to the school grade. Specifically, in the third factor, unstructured assessment practices, it emerges that on average such practices are used mainly by teachers of Italian and English compared to teachers who teach mathematics. In the fourth factor, entitled reflective assessment practices, the data suggest that on average these practices are used mainly by teachers of Mathematics and Italian compared to English. In the fifth factor, called Structured and semi-structured assessment practices, it emerges that on average English and Italian teachers use such assessment practices more than Mathematics teachers. As regards the assessment practices used by teachers following the introduction of DL, from the analysis of the ANOVA test it is possible to see that there are statistically significant differences (value <0.05) with respect to the discipline taught by teachers on the first, second and fifth factor. The first factor, referring to the use of observational tools, is mostly used in primary school. The second, which involves the use of products created by students for evaluation is mainly used by teachers in lower secondary schools. Structured and semi-structured evaluation practices are mainly used by teachers in lower secondary schools.

4.2. Difficulties of teachers in students' assessment

In order to obtain a synthetic outcome measure, the 14 items were subjected to exploratory factor analysis using principal axis factorization and the varimax rotation method with Kaiser normalization as the extraction method. The exploratory factor analysis made it possible to identify 3 factors that explain 59.92% of the total variance which can be interpreted as 3 macro categories of difficulty: interpretation and timing of the assessment, identification of valid tools and technical-instrumental difficulties.

To explore the effect of the discipline taught and the school level on the difficulties encountered by teachers, a one-way analysis of variance was carried out. For the calculation, the discipline (Italian, mathematics, English) and the school level were identified as independent variables and the three factors that emerged from the factor analysis previously carried out as the dependent variable.

From the analysis of the ANOVA test it is possible to see that there are statistically significant differences (value <0.05) in the third factor with respect to the discipline taught and no significant differences with respect to the school grade. Specifically, technical-instrumental

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[4] Scores >.85 indicate similarity between factors.

difficulties were on average less felt by Mathematics teachers than in other disciplines (Italian and English).

5. Discussion

The results just presented have allowed us to identify five different factors identifiable as different evaluation models used by teachers before and after the introduction of DL. The convergence analysis of the factor structures highlighted similarities only on three factors out of five shown. These data suggest a change in the evaluation models used by teachers following the introduction of DL. With respect to the grade and subject taught by teachers, considering the complexity of the situation experienced, require further qualitative investigation.

It is very likely that, during DL, the inadequacy of traditional tools and criteria used for evaluation in face-to-face teaching led to a general decline in the use of evaluation practices in all school grades and forced teachers to deal with the need to reprogram and reorganize evaluation. Several studies conducted in our country during the emergency period have highlighted how the assessment of student learning has represented one of the main critical issues in teaching activities for teachers (SIRD, 2020; Ranieri et al., 2020; Piras, 2020; Giovannella et al., 2020; Cigognini & Di Stasio, 2022; Paramatti et al., 2023). It would seem that in the first months of DL the difficulties encountered by teachers pushed them to resort to the passive reproduction of traditional and transmissive teaching and evaluation methods. Studies have in fact shown that, at least initially, the assessment practices used by teachers remained anchored to the product and focused on quantification (Lucisano, 2020; Lucisano et al., 2020; Capperucci, 2020; INDIRE, 2020; Ceccacci, 2021).

However, as time passed and the emergency continued, thanks also to the publication of ministerial guidelines[5] and the activation of various training initiatives, teachers were pushed to rethink the methods and roles of teaching by strategically remodulating and adapting assessment as well. Over time, while continuing to use structured assessment practices typically of a written type and traditionally used in the classroom, the use of practices referring to a more formative assessment model with the active involvement of students also emerged. Therefore, consistently with what emerged in the study by Giganti and Viganò (2023), in the cases observed, "an evolutionary assessment process" was detected (p. 203). In fact, it would seem that teachers did not limit themselves to a mere transposition of the tools used in traditional practice during DL but acted to identify new assessment practices and tools suitable for distance and consistent with this new imposed educational paradigm. Remote assessment has put teachers in front of the urgent need to give importance to new aspects such as, for example, student's agency, problem solving and soft skills, creativity and cooperation (Grion et al., 2021; Ritella & Sansone, 2020).

Thanks to this unexpected educational transformation, it allowed teachers to leave their comfort zone and move towards a "zone of proximal development" (Vygotsky, 1966) to begin to grasp all the potential offered by technologies for teaching and assessment (Giovannella et al., 2020; Di Palma & Belfiore, 2020).

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[5] See the Note of the Ministry of Education and Merit prot. 279 of 8 March 2020; Operational Note of the Ministry of Education and Merit n. 388 of 17 March 2020; Decree of the Minister of Education and Merit of 26 June 2020, n.39.

The wide range and differences that emerged in the use of assessment practices following the introduction of the DL with respect to the year and the subject taught by the teachers, considering the complexity of the situation experienced, require further investigation.

This study explored teachers' difficulties in assessing students. The main difficulties encountered by teachers in assessing students are related to the identification of appropriate assessment tools and practices, the interpretation of results, the timing of assessment and the difficulties related to the use and issues of technology. With reference to the assessment of learning during DL, teachers' main concerns seem to be related to the authenticity of distance tests and the lack of a fundamental face-to-face relationship in the teaching/learning process and therefore in assessment.

Specifically, studies on the topic have highlighted how one of teachers' main concerns is the uncertainty of the authenticity of tests. In fact, the lack of control would have allowed opportunistic behaviors of students related to cheating during the performance (Giovannella, et al., 2020; Ranieri et al., 2020; Batini et al., 2020; 2021; Paramatti et al., 2023).

From this study, no differences are observed in terms of difficulty with respect to the school level, but substantial differences are observed in technical-instrumental difficulties with respect to the teaching discipline. In fact, Mathematics teachers seem to have fewer problems of a technical-instrumental nature. This difference could be attributable to the initial training received, of a technical-scientific nature, and/or to the greater propensity to use ICT. Despite this, no substantial differences emerge with respect to other types of difficulty. The more expert use of technology, however, does not in itself guarantee fewer difficulties with respect to the overall situation that has arisen with DL because these teachers also report problems similar to those of colleagues in other disciplines. This makes it clear that knowledge of ICT as an end in itself and/or applied in other areas is not sufficient to guarantee effective use in teaching. It is necessary to rethink what was an emergency situation as an opportunity for innovation, as a starting point on which to trigger an intense process of reflection since teachers have been called in a completely unexpected way to get involved, to rethink themselves and their profession, to reinvent themselves, to make use of the knowledge and skills acquired over the years (De Marco, 2020; Baldassarre et al., 2020). Thanks to a flexible and open professional epistemology, in fact, teachers have faced the uncertainty and transformations imposed by the emergency in an innovative way, going well beyond the idea that the application of certain techniques is sufficient for teaching (Striano, 2006; Schön, 1993). Flexibility was the key to developing adaptive and functional responses to the crisis (Doucet et al., 2020; Reimers & Schleicher, 2020). In fact, each teacher, in addition to being a reflective professional (Schön, 1993; 2006), literally reinvented teaching practice, opening new perspectives and other dimensions, overcoming most of the time mental schemes and prejudices that often kept them anchored to a more traditional view of teaching. In the words of Andreas Schleicher, director of the Education and Skills department of the Organisation for Economic Co-operation and Development (OECD), real changes often occur during a deep crisis; therefore, this new way of understanding teaching can represent an opportunity to be seized as we will not return to the status quo, even when things return to "normal": «Real change often takes place in deep crisis, and this moment holds the possibility that we won't return to the status quo when things return to "normal". While this crisis has deeply disruptive implications for education, it does not have predetermined implications. We have agency, and it is the nature of our collective and systemic responses to these disruptions that will determine how we are affected by them. » (Reimers & Schleicher, 2020, p. 5). In this sense, some of the situations experienced during DL could have opened new perspectives for teaching and assessment.

6. Conclusions, limitations and prospects

With reference to the limits, this study concerns a convenience sample of teachers and therefore, the results cannot be generalized to a larger and more diverse sample. Furthermore, the wide range and differences that emerged in the use of evaluation practices following the introduction of DL.

Conducting exploratory research with a mixed method based on explanatory sequential approach, in addition to collecting the "virtuous solutions" adopted by teachers during DL and offering interesting food for thought in order to guide the introduction of digital devices in usual teaching situations for both learning and assessment, could offer useful indications in order to guide training and educational policies useful for redesigning intervention strategies for and in schools. The evidence that emerged from this research allows us to hypothesize the need for specific training of teachers aimed at promoting the conscious use of ICT in teaching and especially in the assessment of learning. In fact, from the research conducted it was possible to intercept some of the problems encountered by teachers during DL specifically connected to teaching in specific contexts, in different school grades and to the teaching of specific subjects. The professional development of teachers is a fundamental element to guarantee quality educational systems, therefore, also based on the results that emerged from this research, it is possible to affirm that in addition to intensifying the training on ICT in service of teachers, it should be specifically designed to respond to the real needs of teachers and teaching.

There is therefore a need for teachers, 'digital immigrants', to use ICT in a reasoned and methodologically coherent way with teaching proposals (Clark, 2010; Guerra, 2010; Messina & De Rossi, 2015). Therefore, even if new technologies are now essential elements in the definition of training curricula for the professional development of teachers, it is necessary "more than the massive or exclusive use of ICT in formal training, it is the one endowed with meaning to qualify progressive learning processes and results" (Domenici, 2014, p. 17). For example, the well-known TPACK model explains that a teacher must be competent with respect to the intersection between three types of knowledge: pedagogy, disciplinary content and technology. The teacher must therefore be competent not only with respect to technology itself, pedagogy and the specific content of his/her disciplinary field, but above all in relation to the intersections of these domains, that is, to those uses of technology that support adequate pedagogical strategies in relation to the teaching discipline (Mishra & Koehler, 2006; Di Blas et al., 2018).

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