

# Fostering Multiliteracies in Language Teacher Education Through Digital Storytelling: Assessing the Effectiveness of an Online Professional Development Intervention (Note 1)

Camilla Spaliviero (Corresponding author)

Department of Linguistics and Comparative Cultural Studies

Ca' Foscari University of Venice

Dorsoduro 1075, 30123 Venice, Italy

E-mail: [camilla.spaliviero@unive.it](mailto:camilla.spaliviero@unive.it)

Graziano Serragiotto

Department of Linguistics and Comparative Cultural Studies

Ca' Foscari University of Venice

Dorsoduro 1075, 30123 Venice, Italy

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## Abstract

The integration of digital tools into education has redefined language teaching and learning, a shift further intensified by the COVID-19 pandemic. This rapid 'digital turn' brought both opportunities and challenges, particularly highlighting teachers' limited digital competences. Within this context, Digital Storytelling (DST), which combines traditional narrative with multimedia resources, has gained attention as a means to support teachers' professional development in multiliteracies. While existing research has largely focused on pre-service language teacher training, little is known about the role of DST in the continuous development of in-service teachers, especially those teaching Italian abroad in the post-pandemic era. This study addresses this gap by investigating the effectiveness of an online professional development intervention (PDI) aimed at enhancing the multiliteracies of 29 Italian language teachers working at the Dante Alighieri Society in Argentina. The PDI

focused on the integrated use of authentic, multimodal materials and digital tools. Changes in teachers' self-assessed multiliteracies skills, beliefs, and practices were analyzed through pre- and post-training questionnaires, reflective diaries, and follow-up questionnaires. Results show that the online PDI promoted more critical, nuanced understandings of multiliteracies and fostered professional growth, while also revealing persistent challenges in applying new digital practices due to contextual limitations.

**Keywords:** Multiliteracies, Online language teacher education, Online teacher professional development, Digital storytelling, Impact

## 1. Introduction

The rapid advancement of Information and Communication Technologies (ICT) has transformed digital tools into indispensable components of everyday communication. The traditional, singular notion of 'literacy', previously limited to reading and writing within a monolingual and monocultural framework, evolved into the broader, plural concept of 'multiliteracies', which embraces different linguistic, cultural, and technological dimensions (Chiang, 2020; Czarnecki, 2009). Closely connected to multimodality, multiliteracies emphasize the ability to construct and interpret meaning across multiple modes of representation, such as written text, images, videos, and digital media (Kalantzis & Cope, 2012; Lotherington & Jenson, 2011). As essential 21<sup>st</sup>-century competences, they support not only effective digital communication but also critical thinking, creative problem-solving, and metacognitive strategies (Bacalija et al., 2021; Warner & Dupuy, 2018).

This technological evolution has promoted a 'digital turn' in language education, initiating a comprehensive reconfiguration of teaching and learning through digital integration (Lutge & Stannard, 2022). The European Union has made it a strategic priority to foster linguistic and digital competences among younger generations. Its *Policies of Innovation in Education* (European Commission, 2022) encourage initiatives that promote both linguistic diversity and digital skills through innovative pedagogical practices. Within this framework, the *Digital Education Action Plan* (2021-2027) provides strategic guidelines to build a high-performing digital education system. A central focus is enhancing educators' digital competence, outlined in the *European Framework for the Digital Competence of Educators*, which includes six key areas such as digital resource creation, digital engagement, and technology-enhanced assessment (Redecker, 2017).

The COVID-19 pandemic further accelerated the integration of ICT into language education, necessitating an abrupt shift from in-person to online instruction and forcing teachers to rethink their pedagogical practices within a digital context (Balirano & Rasulo, 2023; Borro et al., 2021; Carrillo & Flores, 2020; Pozo et al., 2021).

Therefore, in today's post-pandemic landscape, it is worth asking: Which digital practices have endured in language teaching? How do teachers perceive these changes? How have their multiliteracies evolved? Moving from emergency response to sustainable innovation in the long-term integration of ICT in Foreign/Second Language (FL/L2) teaching requires not only institutional support but also digitally competent teachers who prepared to foster

multiliteracies. Yet, the ‘digital turn’ poses challenges, such as inadequate infrastructure, lack of guidance on integrating ICT, and teachers’ limited digital competences (Rasulo, 2017; Yu, 2018).

To address these issues, in 2021 the Itals Laboratory at Ca’ Foscari University of Venice started a research project to examine the impact of training initiatives on innovative pedagogical approaches and authentic multilingual and multimodal resources for in-service teachers of Italian FL in Argentina (cfr. Spaliviero, 2024). The study presented in this article explores the effectiveness of online training in enhancing teachers’ multiliteracies skills.

## 2. Literature Review

### 2.1 *Fostering Multiliteracies Through Digital Storytelling*

Digital Storytelling (DST) is a powerful form of expression that combines traditional narrative techniques with modern multimedia tools, such as images, audio, and video (Balaman, 2018; Lambert, 2002; Ohler, 2008). Like traditional storytelling, DST involves crafting stories on specific themes from a well-defined perspective, ranging from personal experiences to historical and socio-political events. What distinguishes DST from conventional storytelling is its integration of digital elements, which enrich text-based narratives through a blend of visual and auditory components.

Digital stories are typically short, ranging from 250 to 300 words, and lasting between 2 to 5 minutes. Given their concise nature, careful planning of content, narrative structure, and resource organization is essential. According to Lambert (2002) and Lambert and Hessler (2018), digital stories are commonly shaped by seven elements: personal perspective, emotional content, a key moment, story visualization, sound design, content economy, and story sharing. Digital stories are often told in the first person, emphasizing the storyteller’s unique voice and aiming to evoke emotional resonance while conveying meaning concisely. Since they rely heavily on both visual and auditory elements, thoughtful selection of images, the narrator’s voice, ambient sounds, and music is crucial. It is also essential to decide how to communicate their purpose and context (introductory remarks or embedded within the narrative), and to consider their platform for sharing (online channels, classroom settings, or interactive media).

DST and multiliteracies are deeply interconnected (Chiang, 2020; Gregori-Signes, 2014; Robin, 2016). DST fosters multiliteracies by offering a dynamic means of sharing experiences and conveying meaning in the digital age. It engages learners in diverse modes of communication, including linguistic, visual, and audio, and enhances students’ ability to interpret, negotiate, and produce meaning across different media (Kim & Lee, 2018; Ribeiro, 2015; Nair & Yunus, 2021). It also encourages critical thinking, creativity, and collaboration, empowering students to develop digital competences essential for navigating and contributing to an increasingly interconnected world (Benick, 2012; Robin, 2006; Tabieh et al., 2021).

As a result, DST has been widely incorporated into the language classroom across grade levels, with numerous studies highlighting its linguistic, intercultural, and technological benefits (e.g., Czarnecki, 2009; Jamissen et al., 2017; Lambert & Hessler, 2018; Lotherington

& Jenson, 2011; Warner & Dupuy, 2018). Beyond the final product, DST is a process-oriented and task-based approach that emphasizes the learning journey itself. It involves a sequence of activities that guide students through research, writing in the target language, and acquiring new digital skills (Oskoz & Elola, 2016). Each task requires students to address complex issues, engaging them in cognitive and communicative processes such as reading, listening, producing, manipulating, and interacting in the foreign language. This mirrors real-world communication scenarios, reinforcing language acquisition through meaningful, contextualized learning experiences (Ellis, 2003; Nunan, 2004).

To effectively integrate DST into learning, the creative process should be structured into sequential steps, incorporating Lambert's seven elements (2002). However, due to its inherently creative nature, this process is often nonlinear (Castañeda, 2013). Over time, several models have emerged to guide teachers in structuring DST activities (Lambert, 2007; Ohler, 2008; Oskoz & Elola, 2016; Robin, 2016). The most commonly adopted phases include:

1. Content development: Students define the objective (e.g., to inform, persuade, or provoke thought), identify their target audience, research the textual genre and the topic, selecting relevant content and establishing their perspectives.
2. Writing the story: Students draft their script, create a visual portrait of the story, that is a timeline of key narrative moments based on emotional progression, and participate in peer review sessions (story circles) to refine their work before revising the text.
3. Selecting visuals: Students gather, analyze, and integrate visual elements, using original photographs, drawings, or copyright-free online images. They can develop a storyboard to organize content chronologically and refine the narrative structure.
4. Recording audio: Students practice reading their script aloud to improve pronunciation, pacing, and expression before recording their narration. Background sounds or music may be added, provided they adhere to copyright regulations. Feedback from teachers and peers (story screenings) helps refine the final recording.
5. Technology training: Teachers introduce students to the digital tools required to compile their multimedia elements into a cohesive digital story.
6. Presentation and reflection: Students share their completed digital stories with their peers and, if possible, a broader audience.

## 2.2 Teachers' Professional Development in Multiliteracies

The growing integration of DST in language education has led to extensive research into its pedagogical applications. Studies have primarily focused on the impact of DST-based language teaching activities on students' perceived learning outcomes in multiliteracies. For example, research has explored how DST through platforms like *ThingLink*, *StoryMaps*, and *izi.TRAVEL* fosters exploratory skills, vocabulary acquisition, and collaborative learning (e.g., Compagnoni, 2022a, 2022b; Compagnoni & Serragiotto, 2024; Fazzi, 2022b; Roslan & Sahrir, 2020; Spaliviero, 2022a).

Over the past decade, there has been an increasing attention for the role of DST in language teacher education, particularly in fostering teachers' professional development in multiliteracies (Özüdoğru & Cakir, 2017). Teacher professional development is widely regarded as “a key strategy for teacher improvement”, encompassing “any activity which is designed to bring about positive change in practising teachers' competence” (Borg, 2018: 195). DST has proven to be an effective tool for professional development, as it encourages teachers to re-evaluate their pedagogical beliefs and teaching practices. By engaging in DST, whether by creating their own digital stories to introduce new topics or guiding students in doing so, teachers can foster curiosity and active participation, transforming students from passive recipients into engaged learners (Robin, 2006).

A substantial body of research has investigated the initial training of pre-service language teachers in DST, particularly at the primary school level (e.g., Campbell & Kapp, 2020; Cuhadar, 2018; Del Moral-Pérez et al., 2016; Durham, 2022; Gürer, 2020; Ibarra-Rius & Ballester-Roca, 2018; Navila et al., 2023; Normann, 2021; Røkenes, 2016; Shelton et al., 2017; Spaliviero, 2022b; Tour & Barnes, 2022; Yu & Wang, 2024, 2025). Participation in DST projects has been shown to increase teachers' confidence in using ICT, improve their perceived learning outcomes, and strengthen their willingness to integrate DST into the school curriculum. However, findings also highlighted teachers' need for training that enhances both technological proficiency in ICT and familiarity with digital learning tools. For example, Tour and Barnes (2022) examined the experiences of 4 pre-service English language teachers facilitating an after-school multiliteracies program, based on the observation, analysis and creation of podcasts and book trailers using iPads, in an Australian primary school. While pre-service teachers recognized the value of DST and effectively scaffolded students' learning using general pedagogical strategies, they struggled with certain aspects of digital multimodal composing, underscoring the need for more comprehensive teacher training in integrating digital tools into language instruction. More recently, Yu and Wang (2025) explored the challenges and benefits of a collaborative DST project involving 28 pre-service English teachers from two universities in Hong Kong. Through experiential learning activities, including the creation of storytelling videos and teaching materials, participants showed significant gains in English proficiency, motivation, and digital competences. Their involvement in digital collaboration also fostered their creativity, confidence, and critical thinking skills. Key challenges included limited access to digital tools across regions, managing technical difficulties, and the time-intensive nature of digital story production.

Despite the growing recognition of DST as a valuable pedagogical tool, research on its role in the continuous professional development of in-service language teachers remains scarce (e.g., Compagnoni, 2023; Gudmundsdottir & Hatlevik, 2017; Özüdoğru, 2021; Vivitsou et al., 2017). However, in-service training is essential, as it enables teachers to continuously update their skills and integrate emerging ICT, such as DST applications, into their teaching practices. Given the rapid evolution of digital tools, knowledge acquired during initial teacher training can quickly become outdated. Moreover, pre-service education alone does not always provide the hands-on experience and real-world classroom application necessary to

effectively implement DST. In contrast, in-service training offers teachers direct opportunities to experiment with and refine their use of DST in authentic teaching environments. In this regard, Gudmundsdottir and Hatlevik (2017) examined the self-efficacy of 356 newly qualified teachers in Norway regarding ICT use in relation to their initial teacher education. Findings indicated that teachers perceived the quality and contribution of ICT training during pre-service education as inadequate. This underscores the importance of ongoing professional development in enabling in-service teachers to keep pace with technological advancements, supporting colleagues in integrating ICT into language instruction, and ensuring that students are not merely passive consumers of digital content but active creators.

In particular, there is a notable lack of research on the effectiveness of in-service training on DST applications for Italian language teachers working abroad in the post-pandemic period. In 2020, Cinganotto and Turchetta examined the digital training needs of Italian language teachers abroad working in Italian schools and Italian sections of foreign schools. Results showed that digital competences were among the areas teachers felt most in need of improvement. This showed both the limited integration of digital tools in language classrooms and the need for expanding access to ICT training initiatives, especially online, to ensure that teachers can navigate the digital landscape of modern education.

This study aims to address this gap by exploring how DST and particularly *izi.TRAVEL*, a mobile-integrated storytelling app designed for creating audio guides for museums and city tours, can be used to enhance teachers' multiliteracies, modernize their teaching practices, and support the integration of ICT into Italian language education. The research focuses on teaching Italian in Argentina, which ranks first in South America and sixth globally in terms of the number of students of Italian (MAECI, 2019). As reported by Nora Sforza, vice president of the Association of Teachers and Researchers of Italian Language and Culture in Argentina, ICT has opened new opportunities, particularly in small and remote communities (Spaliviero, 2023). However, it also presents significant challenges, as students often demonstrate greater technological proficiency than their teachers, demonstrating the need for pedagogical innovations that extend beyond traditional language instruction.

### *2.3 Assessing the Effectiveness of Online Professional Development Interventions*

The impact of Professional Development Interventions (PDIs) can be evaluated through several key dimensions, including the nature of activities, the number of participants reached, the level of engagement, and the reported or observable outcomes (Borg, 2018). Research on the impact of PDIs typically examines how new inputs contribute to meaningful changes in teachers' perceptions of training content and their adoption of innovative teaching practices, considering both educational contexts and students' needs (Kubanyiova, 2012).

Within the realm of Online Language Teacher Education (OLTE), various training opportunities are offered to support teachers' professional growth, differing in their objectives, instructional strategies, and delivery methods, which may be asynchronous, synchronous, or blended (Powell & Bodur, 2019). Despite this diversity, certain core elements contribute to the overall effectiveness of OLTE programs and, in turn, enhance Online Teacher Professional Development (OTPD). These factors include the development of participants'

digital competences, the improvement of technological pedagogical knowledge, the ability to transfer skills from an online environment to face-to-face teaching, and the promotion of meaningful online interactions (Shin & Kang, 2018). For these programs to be impactful, they must allocate sufficient time for learning and reflection, provide structured guidance, and foster collaboration among teachers to enable knowledge co-construction, experience sharing, and critical discussion (Barnard & Burns, 2012; Darling-Hammond et al., 2017; King, 2002; Li 2020).

However, the successful implementation of OLTE programs requires careful facilitation due to the influence of teachers' different linguistic, cultural, and pedagogical backgrounds. For example, while investigating the impact of OLTE in Argentina, Banegas and Manzur-Busleimán (2014) found that teachers valued autonomy but did not perceive peer collaboration as crucial. In addition, online tutors play a critical role in ensuring that teachers develop the necessary technical and digital skills to actively participate in learning activities and engage with their peers. As Kayi-Aydar and Reinhardt (2022) emphasized, digital environments are not merely tools for teachers' learning but integral contexts that shape their identity and agency. Finally, the global transition to online education accelerated by the pandemic prompted a re-examination of OLTE to address difficulties and improve instructional effectiveness, aimed at fostering teachers' multiliteracies skills. In their review of the research on online FL teaching during the pandemic, Hu & Shen (2024) found that effective online teaching requires teachers to take on multiple roles (e.g., technician, designer, and facilitator) before, during, and after lessons.

The impact of OLTE programs is influenced by a complex interplay of external and internal factors, including training content, teachers' backgrounds, and existing skill sets. The way these factors interact can determine how teachers adapt to new methodologies. Research has indicated that some teachers first adjust their beliefs before changing their teaching practices, while others alter their teaching methods first, which then leads to shifts in their beliefs (Guskey, 2002). Studies have shown that teachers enter the profession with pre-existing beliefs and values about teaching and learning, shaped by personal experiences and environmental factors, which can be resistant to change (Barcelos & Kalaja, 2013; Borg, 2003; Kubanyiova & Feryok, 2015). Meaningful teacher change occurs when training component, such as materials, tasks, and peer interactions, align with teachers' aspirations. When training creates a sense of emotional tension between teachers' current skill sets and their envisioned ideal self, and provides the necessary resources for progress, it becomes a catalyst for genuine transformation (Kubaniyova, 2012). OLTE programs are beneficial due to their greater flexibility, enhanced accessibility for teachers in remote areas, and reduced costs for participants and institutions, and are comparable to in-person training in terms of perceived learning outcomes and teachers' engagement (Dille & Røkenes, 2021; Shin & Kang, 2018). However, it is important to distinguish between teachers' perceptions of the impact of PDIs on their teaching practices and actual evidence of instructional change (Borg 2018; Farrell, 2007). To bridge this gap, integrating practical, application-based components in OLTE programs is crucial to help teachers better understand pedagogical innovations and facilitate the transfer of theoretical knowledge into classroom practice (Borg, 2018).

After the pandemic, research on the impact of OLTE programs on OTPD has increasingly examined technological and pedagogical innovations and teachers' perceived learning outcomes. However, few studies have explored OLTE within language teacher education (Dymont & Downing, 2020; Fazzi, 2022a; Haukås et al., 2022; Lay et al., 2020; Kang & Nam-Huh, 2024). In particular, there is a gap in research on OLTE programs aimed at enhancing professional development in multiliteracies of in-service teachers of Italian abroad. This study intends to contribute to this field.

### 3. The Study

The study investigates the effectiveness of an online PDI focused on the combined use of authentic, multimodal materials and digital tools in the Italian FL classroom. It explores the changes in self-assessed multiliteracies skills, beliefs regarding multiliteracies, and multiliteracies practices among a group of in-service Italian language teachers at the Dante Alighieri Society in Argentina. It also examines the effects of the PDI on these aspects over both a short- and a long-term period. To this aim, three research questions (RQ) were formulated:

RQ1: How do teachers self-assess their multiliteracies skills, and how does this self-assessment change immediately after the PDI and one year later?

RQ2: What are teachers' beliefs regarding multiliteracies, and how do these beliefs change immediately after the PDI and one year later?

RQ3: What are teachers' multiliteracies practices, and how do these practices change immediately after the PDI and one year later?

#### 3.1 The Context

The PDI, delivered entirely online by the corresponding author of this article over three months (April-June 2022), was open to Italian language teachers at the Dante Alighieri Society in Argentina. With nearly 130 centers distributed across the country, the Dante Alighieri Society is one of the most prominent institutions dedicated to promoting Italian language and culture, accounting for 27% of all Italian language students in Argentina. It offers courses for learners of all ages and proficiency levels. The pandemic and its aftermath have significantly transformed the course offerings, leading to greater diversification. While some courses have returned to in-person instruction, others remain fully online to accommodate students living across Argentine vast territory. Moreover, hybrid courses combining online lessons with face-to-face meetings have been introduced and maintained post-pandemic to provide flexible learning opportunities.

The PDI was structured into two synchronous seminars and three asynchronous modules. The third and final module, lasting one month, focused on developing multiliteracies through DST. Teachers were introduced to the main characteristics and stages of DST, and became familiar with a set of DST tools, such as *Thinglink*, *Microsoft Photo Story 3*, and *WeVideo*. Then, they were introduced to *izi.TRAVEL* and created their own digital city tours. They gathered and organised textual and multimodal materials, including recording audio files of themselves



reading their descriptions using the digital tools introduced in the module, and selected representative images of the locations, either original or open-access (Creative Commons licensed). Teachers observed each other's digital city tours, reflected on the DST process, and discussed how to use of *izi.TRAVEL* in their courses. Additionally, they examined existing DST-based teaching projects, and explored ways to adapt them to their own teaching contexts. Finally, working in small groups, they designed and shared DST activities including authentic, multimodal materials and *izi.TRAVEL*, and received feedback from both the researcher and their colleagues.

### 3.2 Participants

The study involved 29 teachers working in 7 centers of the Dante Alighieri Society in Argentina, of whom 17 completed the training. All participants voluntarily enrolled in the PDI. The selection process began by contacting the presidents of approximately 15 centers, with a preference for larger ones due to their broader range of teaching formats. About half of the centers shared the training opportunity with interested teachers. The PDI had limited spots, as the aim was to explore OTPD in depth with motivated participants. Although the number of applicants slightly exceeded expectations, all were ultimately accepted. Therefore, participants were selected using purposive sampling (Cohen et al., 2017; Dörnyei, 2007). They constituted a typical sample, as all were Italian language teachers from the Dante Alighieri Society in Argentina and taught diverse types of courses, including in-person, online, and blended formats. Moreover, they formed a convenience sample, as they were readily available and willing to participate in the study.

The majority of teachers were female (93%), with a small proportion of male participants (7%). Their age distribution was broad, with 38% aged between 51 and 60 years, 24% between 31 and 40 years, 17% over 61, 14% between 41 and 50 years, and 7% between 20 and 30 years. Regarding nationality, 52% of the teachers were Argentine, 28% held dual Italian-Argentine citizenship, and 20% were solely Italian. Most participants (73%) had academic qualifications in language education, including 49% with a degree and 24% with a diploma. In contrast, 17% had no formal training in language teaching and 10% were still in training as students in the *Profesorado* program. In terms of teaching experience, 45% of the teachers had been teaching Italian for more than 21 years, followed by 21% with 6-10 years of experience, 17% with 16-20 years, 10% with 1-5 years, and 7% with 11-15 years. The majority of teachers (65%) taught in-person courses, while 28% taught online and 7% delivered lessons in a blended format. Notably, despite the extensive teaching experience of many participants and the post-pandemic context, none had previously received training in using DST in the FL classroom. This background information was gathered through an enrolment questionnaire including factual questions, which was completed before the start of the PDI. On that occasion, the aim and procedures of the study were presented, and informed consent for data collection was obtained.

### 3.3 Methodology

Given its longitudinal nature, this study adopted a multiphase mixed-methods approach and followed a longitudinal single-case study design (Creswell & Plano Clark, 2018; Yin, 2018).

The research centred on a single experiment, i.e. the PDI, and on a single unit of analysis, i.e. the group of teachers participating in the training. To assess the effectiveness of the online PDI, impact evaluation was a fundamental component of the study and was integrated into the training design. Both qualitative and quantitative data were collected at multiple points at specific time intervals, that is before, during, and at the end of the PDI (April-June 2022), as well as one year later (March 2023). The aim was to understand the effectiveness of the online PDI by providing a comprehensive view of how teachers' perspectives on multiliteracies evolved (Borg, 2018; Ortega & Ibarra-Shea, 2005).

### 3.3.1 Data Collection Procedure

Data were collected through pre- and post-training questionnaires, reflective diaries, and follow-up questionnaires. Qualitative data came from open-ended questionnaire items and reflective diaries, while quantitative data came from closed-ended questionnaire items. The data collection procedure varied depending on the instruments used:

#### a. Pre-training and post-training questionnaires

Teachers completed an anonymous, web-based questionnaire before and at the end of the PDI. The questionnaire focused on teachers' self-assessed skills, beliefs, and practices related to the themes of the PDI. For this study, 10 items related to multiliteracies are considered, including 7 closed-ended items and 3 open-ended questions. Almost all items in pre- and post-training questionnaires were identical, but few questions were added to investigate the initial and the final situation. All 29 teachers completed the pre-training questionnaire, while 17 completed the post-training one.

#### b. Reflective diaries

At the end of each module, teachers reflected on the potential changes in their self-assessed skills, beliefs, and teaching practices filling out a web-based reflective diary. For module 3, they responded to 6 reflective questions designed to facilitate reflection on multiliteracies. A total of 18 teachers completed the reflective diary for module 3.

#### c. Follow-up questionnaires

One year after the end of the PDI, teachers completed another anonymous, web-based questionnaire, which was structured into different sections assessing the long-term effects of the PDI on their practices. For this study, 2 items related to multiliteracies are considered, including 1 closed-ended item and 1 open-ended question. A total of 17 teachers completed the follow-up questionnaire.

### 3.3.2 Data Analysis Procedure

Reflective thematic analysis was employed to analyse qualitative data from open-ended questionnaire items and reflective diaries (Braun & Clarke, 2012). Following verbatim transcription, the data were imported into *NVivo 12* software for initial and second-level coding (Creswell, 2014). The data were first segmented into discrete codes, which were then clustered and consolidated into broader, representative categories. The coding process was

both deductive, based on existing literature, and inductive, allowing new codes to emerge from the data, such as ‘post-pandemic necessity’. Visual representation through tables supported the analysis, while direct quotes from participants provided deeper insights into their experiences. Teachers’ quotes were translated from Italian to English by the researcher.

Descriptive statistics were used to analyse quantitative data from closed-ended questionnaire items. These data were exported from the survey administration software into an *Excel* spreadsheet, where they were coded and analysed. The results were presented in graphs to show key trends (Dörnyei, 2010).

## 4. Results

### 4.1 Pre-training and Post-training Questionnaires

Figure 1 shows teachers’ self-assessment of their multiliteracies skills before and at the end of the PDI. Responses were measured on a six-point scale, ranging from 1 (very low) to 6 (very high). Before the training, many teachers rated their multiliteracies skills as high (31%) and good (24%). Moreover, 21% of teachers assessed their multiliteracies skills as very high, while an equal percentage rated them as moderate. Only a small percentage (3%) considered their multiliteracies skills low, and none reported very low. After the training, the distribution of self-assessments changed. The largest proportion of teachers rated their multiliteracies skills as good (29%), followed by high (23%) and moderate (18%). Some teachers assessed their multiliteracies skills as very high (12%), while others rated them as low (12%). A small percentage (6%) reported very low multiliteracies skills.

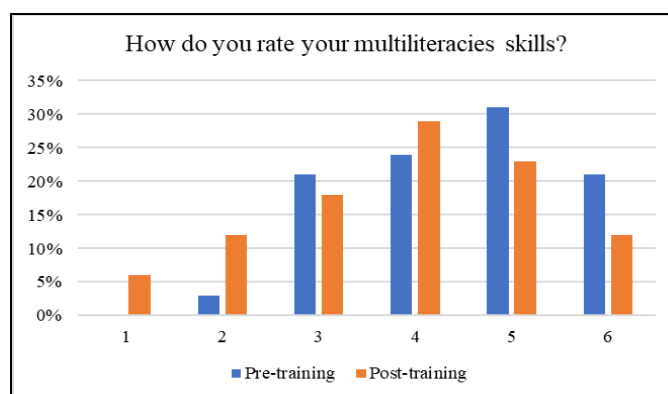


Figure 1. Multiliteracies self-assessment before and after the PDI

After the training, teachers were asked whether they believed their multiliteracies skills had changed compared to their initial level. Responses were categorised on a four-point scale, ranging from 1 (very little) to 4 (very much). Teachers respectively reported little (41%), very much (36%) and much (23%) improvement. No teacher selected very little.

Figure 2 shows teachers’ beliefs about the use of digital tools to promote multiliteracies before and at the end of the PDI. Responses were measured on a four-point scale, ranging from 1 (not useful at all) to 4 (very useful). Before the training, the majority of teachers (86%) considered digital tools to be very useful for promoting multiliteracies in the FL

classroom. Additionally, 14% of teachers rated them as somewhat useful. None considered them either not very useful or not useful at all. After the training, most teachers (65%) still viewed the use of digital tools as very useful for promoting students’ multiliteracies, though this proportion decreased. A larger portion of teachers (41%) considered them somewhat useful. As was the case before the training, no teacher rated them as not very useful or not useful at all.

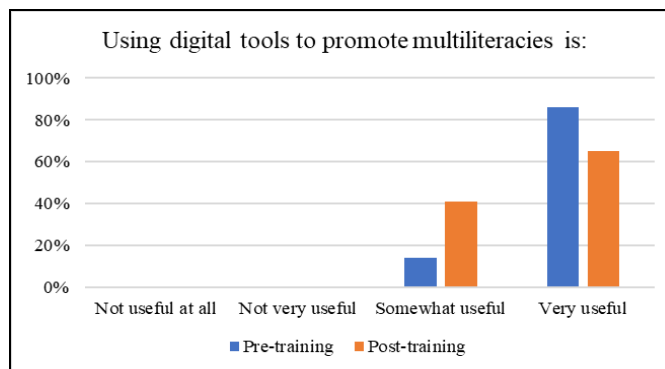


Figure 2. Beliefs regarding multiliteracies before and after the PDI

Table 1 presents the key themes and codes related to teachers’ reflections on multiliteracies before and at the end of the PDI. Multiple codes can be related to the same teacher, since their answers often included more than one.

Table 1. Themes and codes on beliefs regarding multiliteracies before and after the PDI

Themes	Codes	Occurrences pre-training	Occurrences post-training
A. Contextual needs	Digital era	4	6
	Post-pandemic necessity	3	2
	Complementarity with traditional teaching	3	1
B. Teaching benefits	Access to unlimited resources	6	2
	Professional development	4	2
	Adaptability to students’ needs	1	-
	Modernization of teaching	-	2
C. Learning	Dynamism, motivation, engagement	8	6

benefits	Enhancement of language skills	3	1
	Multimodality	2	1
	Enhancement of multiliteracies	2	1
	Peer collaboration	2	1
	Students' autonomy	2	-
D. Authentic language and culture	Connection with real language	5	2
	Connection with current culture	2	1
	Overcoming geographical distances	2	1
E. Challenges	Accessibility	1	-
	Overcoming traditional teaching	1	-
	Proper use for effective learning	-	2

Regarding the contextual needs (Theme A.), before the training teachers highlighted the importance of using digital tools due to their full integration into everyday life (14%), the post-pandemic need for online and blended courses (10%), and the complementarity of digital tools with traditional, paper-based teaching resources (10%) (quotes 1, 2, 3).

[quote 1] Digital tools reflect the changes inherent in the historical context in which we live.

[quote 2] I only started using digital resources the way I do today because of the 'forced' introduction of remote learning during the pandemic.

[quote 3] They complement both in-person teaching and synchronous virtual learning.

After the training, teachers' responses were categorized under the same codes but with different percentages. 35% of teachers referred to the digital era, 12% to the post-pandemic necessity, and 6% to their complementarity with traditional teaching (quotes 4, 5, 6).

[quote 4] Digital tools adapt to the times. They are widely used in everyday communication.

[quote 5] Technology was already part of our teaching, but during the pandemic we had to learn how to use it effectively and improve our relationship with it.

[quote 6] Digital resources are essential for virtual lessons.

With respect to the teaching benefits (Theme B.), before the training teachers saw digital

tools as supplementary resources that provide access to unlimited materials (21%), support their professional growth by enhancing multiliteracy skills (14%), and help adapt to students' needs (3%) (quotes 7, 8).

[quote 7] Digital tools provide access to an immense amount of information and ideas. A 21<sup>st</sup>-century teacher must be aware of the importance of technology and be prepared to integrate it into daily work.

[quote 8] There are endless resources to share, watch, and listen to. I feel comfortable using web platforms. You can switch from a relaxing song to a grammar topic, then play an interactive game, work in groups with different classmates, read a newspaper, or watch an advertisement. These resources are always available and can be adapted based on students' enthusiasm and needs.

After the training, teachers' responses largely fell into the same codes, though with different percentages. 12% of teachers emphasized access to unlimited resources, and the same percentage highlighted professional development. Additionally, a new code emerged, that is modernizing teaching (12%) (quotes 9, 10).

[quote 9] Nowadays, if we don't include digital tools in our lessons, we will get left behind.

[quote 10] Digital resources allow for the use of more modern teaching methods beyond traditional ones.

As concerns the learning benefits (Theme C.), before the training many teachers referred to the dynamic nature of digital tools in fostering students' motivation and engagement (28%). They also recognized their potential to enhance language learning (10%), promote multimodality (7%), develop students' multiliteracies (7%), encourage interaction and collaboration (7%), and support autonomy through active research (7%) (quotes 11, 12, 13).

[quote 11] Digital tools are engaging, stimulating, and even fun teaching resources. They help engage students in different ways, allowing them to develop all key language skills.

[quote 12] Digital resources undoubtedly promote multisensory learning. I believe this adds another dimension to studying, learning, and guiding students through the learning process.

[quote 13] They encourage students' curiosity and research, which is essential for autonomy.

After the training, teachers' responses covered nearly all the same codes, with relatively similar proportions. Motivation and engagement remained the most frequently mentioned benefit (35%), followed by the enhancement of language learning (6%), multimodality (6%), multiliteracies (6%), and peer collaboration (6%) (quotes 14, 15).

[quote 14] Digital resources place students at the center of the lesson, making the learning experience more dynamic.

[quote 15] Digital skills are key 21<sup>st</sup>-century competences. Traditional tools do not allow for certain activities that digital resources can facilitate, such as integrating text, images, and sound, offering both linguistic and technological benefits.

As for the authenticity of language and culture (Theme D.), before the training some teachers reflected on the connection between digital tools and exposing students to real language (17%) and culture (7%), as well as their role in overcoming geographical distances (7%) (quote 16).

[quote 16] Digital resources have proven to be extremely useful in connecting those of us who use the Italian language far from Italy with real, authentic, and up-to-date language.

After the training, teachers' responses fell into the same codes but with diverse proportions. 12% of teachers considered the connection with real language, while 6% referred to the exposure to current culture and the bridge of geographical distances (quote 17).

[quote 17] Technology can help shorten real-world distances and allow to immerse in different worlds, including cultures, geographies, cuisines, and perspectives.

Regarding the challenges (Theme E.), before the training some teachers identified difficulties related to technology accessibility (3%) and the complete replacement of traditional teaching methods (3%) (quote 18).

[quote 18] Technology is widely accessible to a large part of society, but not to everyone. That's why it is important to use it as an additional teaching resource rather than the only one.

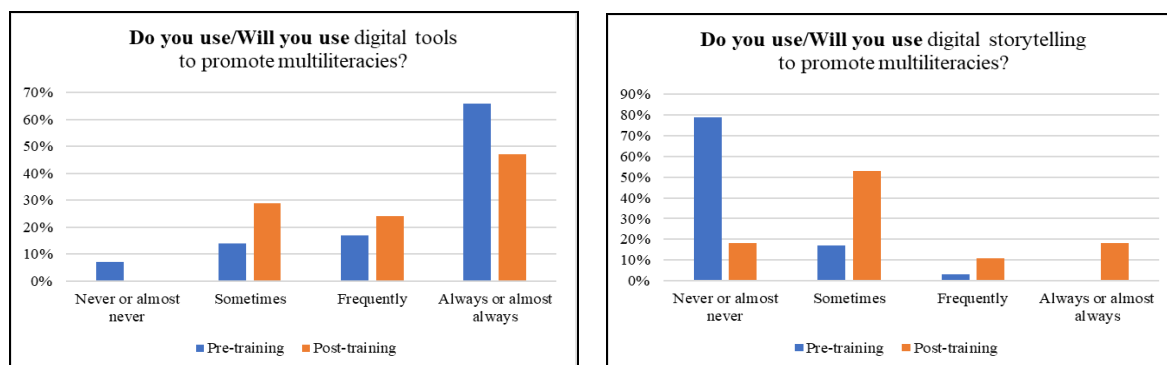
After the training, teachers' responses no longer fit within these codes. Instead, they introduced a new concern, that is the importance of using digital tools correctly to ensure effective learning (12%) (quote 19).

[quote 19] Digital resources can be highly motivating, but we should employ them correctly, otherwise it produces opposite effects.

In their classrooms, teachers reported to have access to internet connection (95%), computers (86%), projectors (66%), tablets (24%), interactive whiteboards (21%), televisions (10%), and recorders (3%). Only a small percentage (3%) stated that the institution was still in the process of equipping the physical classroom with digital tools. Teachers usually made use of nearly all available multimedia tools, with the internet connection (97%) and computers (93%) being the most commonly used. The percentage for computers is higher than that of in-class multimedia tools availability because 7% of teachers reported to use their personal computers for online lessons. Projectors follow (45%), along with tablets (24%), and interactive whiteboards (21%). Some teachers (3%) also used televisions, recorders, and smartphones.

Figures 3 and 4 show teachers' multiliteracies practices related to their use of digital tools and DST. Before the PDI, teachers were asked about their current multiliteracies practices ("Do you use digital tools to promote multiliteracies?"), while after the PDI they were asked about their future multiliteracies practices ("Will you use digital tools to promote multiliteracies?"). Responses were measured on a four-point scale, ranging from 1 (never or almost never) to 4 (always or almost always). As concerns digital tools (Figure 3), before the training most teachers (66%) reported to use platforms and applications always or almost always. Moreover, 17% of teachers used them frequently and 14% sometimes, that is respectively more and less than half of their lessons. A small percentage (7%) reported to use them never or almost never. After the training, almost half of the teachers (47%) would use digital tools always or almost

always in their future lessons. Others would employ them sometimes (29%) and frequently (24%). None reported to intend to use them never or almost never. Regarding DST (Figure 4), before the training the majority of teachers (79%) reported to never or almost never use DST. Some (17%) used it sometimes, and a few (3%) frequently. None reported to use it always or almost always. After the training, a bit more than a half of the teachers (53%) would use DST sometimes in their future lessons. Others would employ it always or almost always (18%) and frequently (11%). Another 18% would use it never or almost never.



Figures 3-4. Multiliteracies practices before and after the PDI

Teachers were asked to explain which platforms, applications, and DST tools they had used and will use. Before the training, 10% of teachers reported not to use digital tools, while 90% incorporated a variety of multimedia content, interactive learning, and communication tools, especially in online lessons. They usually employed learning management systems and virtual classrooms (*Google Classroom, Moodle*), video conferencing tools (*Zoom, Google Meet, WebEx*), presentation and multimedia tools (*Power Point, Genially, Prezi, Canva, Whiteboard*), interactive and gamification tools (*Kahoot, Mentimeter, Wordwall, Padlet, Learning Apps*), timeline and mapping tools (*Tripline, Timeline*), document management tools (*Acrobat Reader*), audio-visual and streaming platforms (*YouTube, Vimeo, Spotify*), social media platforms (*Instagram, Facebook, WhatsApp*), online dictionaries, and open-access educational websites (quotes 20, 21).

[quote 20] I use *Zoom* for my lessons. I often organize group work in breakout rooms, and I find the ability to let students write on the screen very useful. I use *Google Classroom* to share materials and grade assignments, and *Wordwall* to reinforce grammar topics through games. *Acrobat Reader* allows me to view textbooks, *YouTube* for videos, and *Spotify* to play songs during coffee breaks. I also make use of open-access teaching materials downloaded from websites for teaching Italian, which students can view when I share my screen.

[quote 21] My answer refers to the pandemic period: I used some search engines, *Zoom, YouTube, Word, PowerPoint, WhatsApp*, and MP3 audio files.

After the training, 47% of the teachers reported that they will include DST, and especially *izi.TRAVEL*, in their future lessons, both in-person and online (quotes 22, 23).

[quote 22] I will use the Institution's platform, which is *Google Classroom*, the ones I currently use such as *Wordwall*, and I will try to use *izi.TRAVEL* when time allows.



[quote 23] I would like to include digital tools in in-person courses. *izi.TRAVEL* is an application that can allow students to explore the paths, streets, monuments, and places, also in association with other applications such as *Google Earth* and *YouTube*.

Teachers were asked to provide an example of a DST activity they had implemented and will implement. Before the training, the majority (76%) reported not having used it, while 24% of teachers mentioned incorporating it into their lessons. However, 17% of them considered creative writing activities without referring to digital tools (quotes 24, 25).

[quote 24] Looking at a painting with various characters and creating a story.

[quote 25] A kind of collaborative writing activity, where students start with an initial text, reformulate it, and continue the story, which is only read in full at the end.

One teacher reported using DST occasionally to present cultural content (quote 26), and another did not know the meaning of DST (quote 27).

[quote 26] I have used Digital Storytelling to tell stories about Italian history, but very rarely.

[quote 27] I do not know what Digital Storytelling is. I associate the term with marketing.

Only one teacher mentioned integrating DST tools into their teaching practices (quote 28).

[quote 28] Years ago, I worked on ‘Reconstructing the History of Theater’ with younger students. They conducted research, wrote a script, created their own masks, and recorded a video to share with each other and the theater teacher. They then listened to their performance and took notes on the emotions it evoked.

After the training, most teachers (76%) expressed their intention to implement DST activities in their future lessons. They plan to use DST to encourage students to tell stories, share historical facts, create cultural itineraries, present artists’ and writers’ biographies, as well as their own, and interpret literary texts (quotes 29, 30).

[quote 29] Students could create a digital story about their family’s migration history. Alternatively, they could collaborate based on their region of origin to present traditional festivals from different cities. This would also provide an opportunity to explore historical and cultural aspects, such as city tours, restaurants, monuments, landmarks, and more.

[quote 30] DST would allow students to present writers and excerpts from literary texts, encouraging them also to talk about their ideas and worldviews by reinterpreting the texts.

#### *4.2 Reflective Diaries*

Table 2 presents the key themes and codes that emerged from teachers’ reflective diaries on module 3. Since teachers could reference multiple aspects in their reflections, each participant may be associated with more than one code.

Table 2. Themes and codes on multiliteracies self-assessment before and after the PDI

Themes	Codes	Occurrences
A. Prior knowledge	No prior knowledge	9
	General understanding of DST	6
	Familiarity with some digital tools	2
	Knowledge of teaching unit structure	1
B. New knowledge	<i>izi.TRAVEL</i> from a teacher's perspective	7
	Aims and features of DST	6
	<i>izi.TRAVEL</i> from a user's perspective	3
	Completely new knowledge	3
C. Usefulness	All activities	10
	Creating a digital city tour with <i>izi.TRAVEL</i>	6
	Designing DST activities	6
	Collaborating with colleagues	1
D. Challenges	Using new digital tools	8
	No difficulties	6
	Time constraints	3
	Rethinking teaching practices	2
E. Keywords	Innovation	5
	Engagement	5
	Creativity	3
	Professional growth	2
	Struggles	2

Before module 3, half of the teachers (50%) had no prior knowledge of DST (Theme A.). Others had only a very general understanding of DST (33%) and some knowledge of digital tools (11%), while a small percentage knew the overall structure of the teaching unit (6%) (quotes 31, 32).

[quote 31] At the beginning of the module, I had only a superficial idea of Digital Storytelling.

[quote 32] I had heard of Digital Storytelling, but I had never explored any resources or created teaching materials.

During module 3, many teachers felt they had learned how to use *izi.TRAVEL* for pedagogical purposes (39%), as well as deepened their understanding of the main aims and features of DST (33%) (Theme B.). Some teachers mentioned gaining insights into *izi.TRAVEL* from a user's perspective (17%), while others perceived the entire content of module 3 as completely new (17%) (quotes 33, 34).

[quote 34] I learned how to create a tour on *izi.TRAVEL* and was introduced to Digital Storytelling for the first time. I had never experienced this method of narration applied to teaching, neither as a student nor as a teacher.

[quote 35] I learned what Digital Storytelling is and how to work with this approach.

Most teachers perceived all activities useful for their professional development in multiliteracies (56%) (Theme C.). Some specifically mentioned creating a digital city tour with *izi.TRAVEL* (33%) and designing DST activities (33%). A small percentage (6%) highlighted the opportunity to exchange ideas with colleagues and observe their activities (quotes 36, 37).

[quote 36] Designing a tour on *izi.TRAVEL* and creating a teaching unit using Digital Storytelling were particularly valuable. These activities connected the different modules covered throughout the course, especially the teaching unit design. They were stimulating, creative, and challenging. Developing these proposals pushed me beyond my comfort zone and expanded my knowledge.

[quote 37] Working with *izi.TRAVEL*, first individually and then in a teaching context, was the most significant experience for me. It was a completely new activity. I also found it valuable to see examples created by my colleagues.

Many teachers (44%) identified learning to use new digital tools as their biggest challenge (44%) (Theme D.). Others reported no difficulties with the module content (33%). Some teachers mentioned time constraints (17%), while others reflected on rethinking their teaching practices to integrate DST into their future lessons (11%) (quotes 38, 39).

[quote 38] I consider myself almost digitally illiterate. I never received a systematic or institutionalized digital education. I tackled the challenges by using the available tutorials, reviewing the module's bibliography, and consulting people who knew more than I did.

[quote 39] Thanks to the tutorial provided in the module, I had no issues. The only thing that

made me pause was rethinking how to incorporate apps into my lessons.

The keywords teachers used to describe module 3 highlighted innovation (28%), with terms like “modern”, “original”, and “technologically-driven” (Theme E.). Another 28% of teachers focused on engagement (28%), using words such as “fun”, “interactive”, and “stimulating”. Some teachers emphasized creativity (17%), frequently using the word “creative”. Others reflected on their professional growth (11%), using phrases like “challenge”, “work in progress”, and “technology: I don’t fear you!”. Finally, struggles (11%) were also mentioned, with some teachers repeating the word “frustration”.

#### 4.3 Follow-up Questionnaires

Figure 5 shows teachers’ multiliteracies practices related to DST one year after the end of the PDI. Responses were measured on a four-point scale, ranging from 1 (never or almost never) to 4 (always or almost always). Many teachers (41%) reported to implement DST activities never or almost never. However, 35% of teachers have introduced them sometimes, and another 18% frequently, that is respectively less and more than half of their lessons. Some teachers (6%) have implemented DST activities always or almost always.

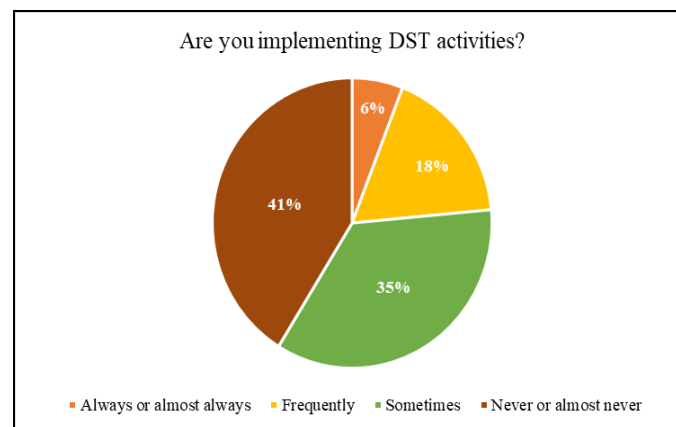


Figure 5. Multiliteracies practices one year after the end of the PDI

Table 3 presents the key themes and codes related to teachers’ reflections on their multiliteracies practices one year after the end of the PDI. Also in this case, more than one code can be associated with the same teacher.

Table 3. Themes and codes on multiliteracies practices one year after the end of the PDI

Themes	Codes	Occurrences
A. Barriers to implementation	Lack of time	4
	Generational gap	3
	Institutional challenges	2

B. Interest in training	Willingness to explore the topic deeper	3
	Personal preparedness	2
C. Learning benefits	Enhancement of multiliteracies	2
	Encouraging creativity	1
	Fostering engagement	1
	Social development	1
D. Teaching benefits	Digital transformation in education	1
	Need to stay updated	1

As regards the barriers to implementation (Theme A.), teachers mentioned lack of time (24%), the generational gap with older students struggling with technology (18%), and the absence of established digital frameworks within their institution (12%) (quotes 40, 41, 42).

[quote 40] I implement multiliteracies practices only sometimes due to a lack of time and the complexity of using digital tools. Older students tend to be more reserved, especially at the beginning of the course. Younger students, on the other hand, adapt more easily.

[quote 41] Older students often don't know how to use technology. With adolescents, however, I frequently incorporate digital resources.

[quote 42] This approach has not yet been formally established where I work, so other types of activities are currently prioritized.

With respect to their interest in training (Theme B.), teachers expressed their willingness to explore the topic further (18%) based on their need for additional professional development, as they still feel unprepared to implement digital tools in the classroom (12%) (quotes 43, 44, 45).

[quote 43] I would like to delve deeper into the topic, I need more information.

[quote 44] I don't yet feel prepared to introduce DST activities.

[quote 45] The technological aspect is something I still need to further develop in order to improve my lessons and engage students in learning and using digital tools.

As for their learning benefits (Theme C.), teachers mentioned the enhancement of multiliteracies, referring to the development of various literacy skills through the use of digital tools (12%). Others also referred to creative writing activities (6%), engagement through collaborative learning experiences (6%), and social development (6%) (quotes 46, 47).

[quote 46] Digital Storytelling supports the development of various skills, strengthens

memory and cognitive abilities, and enhances linguistic, digital, and social competences in a dynamic and interactive way.

[quote 47] Students can practice creative writing, develop emotions, and become more familiar with new technologies.

Concerning the teaching benefits (Theme D.), teachers mentioned the evolution towards technology-based language teaching (6%) and their perceived need to stay updated, stressing the importance of continuous training (6%) (quote 48).

[quote 48] Technology is now an integral part of this new era. It's important to stay up to date and incorporate it into the language classroom.

## 5. Discussion

The data collected from this case study enabled a detailed analysis of the changes in teachers' self-assessed multiliteracies skills, beliefs about multiliteracies, and multiliteracies practices, allowing to discuss the effectiveness of the online PDI in enhancing their professional development.

In terms of teachers' self-assessment of their multiliteracies skills (RQ1), the data revealed discrepancy between their overall positive initial self-assessments and their actual knowledge of multiliteracies-related teaching practices. Before the training most participants rated their abilities as high or good, followed by very high and moderate. Only a small percentage considered their multiliteracies skills low, and none selected very low. This initial self-perception may reflect a general sense of confidence or familiarity with digital teaching practices. However, at the beginning of module 3, most teachers reported to have little or no prior knowledge of DST, with many explicitly stating that they were unfamiliar with the concept or had only a vague understanding. Very few were aware of specific digital tools or had experience in designing DST activities. During the training, teachers reported significant gains in understanding the main features of DST and in learning to use *izi.TRAVEL*, both from users' and teachers' perspectives. They particularly valued the creation of digital city tours, the design of DST-based activities, and opportunities for exchange with colleagues. These experiences were considered highly beneficial to their professional development in multiliteracies. Despite these positive outcomes, teachers also faced several challenges. The most commonly cited difficulty was learning to use new digital tools, followed by time constraints and the need to rethink their pedagogical approach from a digital perspective. Teachers frequently used keywords linked to innovation, engagement, creativity, and professional growth to describe their experience of module 3, though struggles were also mentioned. By the end of the PDI, teachers' self-assessment of multiliteracies skills was more evenly distributed across the rating scale. While good and high remained the most frequent responses, a broader range of options was selected, including very high, moderate, low, and even very low. This more nuanced distribution may indicate a heightened awareness of the complexity of multiliteracies and a more critical, reflective stance toward their own skills as a result of greater exposure to DST. Most teachers perceived a slight overall improvement in their multiliteracies skills, suggesting that all experienced some degree of professional

development through the PDI. One year later, many teachers remained interested in further training in DST. Some expressed a desire to deepen their understanding of the topic, while others cited a continuing sense of unpreparedness to fully use digital tools and implement DST activities in the Italian FL classroom. The desire to stay updated and further explore DST demonstrates that teachers recognized multiliteracies not as a fixed set of skills but as part of an evolving professional competence. Teachers' professional growth aligns with European policy frameworks promoting digital professional engagement as essential for building inclusive education systems (Redecker, 2017). These results also confirm the importance of targeted professional development initiatives in bridging the gap between teachers' perceived and actual digital competences, as well as in fostering a more informed and critical engagement with multiliteracies in the language classroom (Balirano & Rasulo, 2023; Rasulo, 2017; Yu, 2018). Moreover, the findings are consistent with research on the integration of DST in language teacher education, which frames it not merely as a technical adjustment but as a fundamental pedagogical reorientation (e.g., Özüdoğru & Cakir, 2017; Robin, 2006).

As concerns teachers' beliefs (RQ2), the data consistently showed a positive attitude toward the role of digital tools in promoting multiliteracies. Both before and immediately after the PDI, most teachers considered the use of digital tools to be very useful or useful for fostering multiliteracies in the Italian FL classroom, with none expressing negative views. However, by the end of the PDI the distribution of responses changed. While the proportion of teachers who rated digital tools as very useful decreased, a larger percentage judged them somewhat useful. This shift may indicate a more nuanced and realistic understanding of the benefits and limitations of digital tools, developed through hands-on experience and critical engagement during the PDI. This interpretation is supported by post-training reflections, where teachers highlighted the importance of using digital tools appropriately to ensure meaningful learning outcomes. The open-ended questionnaire responses further enriched the understanding of these evolving beliefs. Before the training, teachers primarily justified their positive views by referring to contextual needs (e.g., living in a digital era, post-pandemic shifts in education), the teaching benefits (e.g., access to unlimited resources, professional growth), and the learning benefits (e.g., motivation, engagement, and autonomy). Digital tools were also seen as enablers of authenticity by connecting students to real language use and contemporary culture. After the training, many of these themes remained prominent, though some were re-evaluated or expressed with greater nuance. A new emphasis emerged on the need to modernize teaching practices and align them with current technological trends. Moreover, in terms of challenges, there was a shift to concerns about pedagogical effectiveness and the critical use of technology, with teachers stressing that digital tools must be meaningfully integrated into teaching practices rather than adopted for their novelty alone. This may indicate a maturation of beliefs as teachers moved from surface-level appreciation of digital tools toward a deeper pedagogical reflection. One year later, teachers' beliefs had not only persisted but deepened in some cases. They reiterated the value of digital tools and particularly DST in fostering multiliteracies, and highlighted the continued need for professional growth in this area in light of the ongoing digital transformation in education. These findings align with previous research that framed DST as an essential element for

modern, relevant teaching that fosters critical thinking, creativity, and collaboration, while engaging learners in dynamic and multimodal means of meaning-making (e.g., Gregori-Signes, 2014; Kim & Lee, 2018; Tabieh et al., 2021). Moreover, the results reflect the importance of task-based, process-oriented learning in DST to ensure pedagogical relevance (e.g., Oskoz & Elola, 2016). Finally, they confirm that sustained engagement with DST not only improves teachers' multiliteracies and pedagogical confidence but also reinforces their critical thinking skills and motivation for ongoing professional development (e.g., Tour & Barnes, 2022; Yu & Wang, 2025).

Regarding teachers' multiliteracies practices (RQ3), the data revealed a nuanced understanding of how teachers engaged with digital tools and DST before, immediately after, and one year following the training. Before the PDI, most teachers reported having access to a wide range of multimedia tools in their classrooms and frequently using digital resources in their lessons, indicating a pre-existing integration of ICT in their teaching practices. However, the use of DST was considerably lower, with the majority of teachers stating that they had never or almost never used it. Only one teacher explicitly referred to multimodal practices aligned with DST principles. After the PDI, teachers' intentions to incorporate both digital tools and DST into their teaching increased. While slightly fewer teachers indicated that they would always or almost always use digital tools moving forward, none reported intending to avoid them entirely. Moreover, in contrast to their previous limited use, many teachers expressed greater willingness to implement DST in their future lessons, whether occasionally, frequently, or consistently. Teachers envisioned DST as a way to present cultural itineraries, share personal and literary narratives, and explore historical themes. Applications such as *izi.TRAVEL* were frequently mentioned, often in combination with other tools like *Google Earth* or *YouTube*. Despite the promising change in intentions, follow-up data suggest a more limited implementation of DST, revealing a gap between initial goals and sustained practices. While some teachers reported regular use of DST, a large proportion still used it rarely or not at all. Teachers identified several barriers to implementation, including lack of time, a generational gap that made it difficult for older students to engage with ICT, and institutional constraints such as the absence of established digital frameworks or support. These findings are consistent with previous research highlighting the limited presence of DST in in-service language teachers' practices, as well as the frequent failure of initial teacher training to equip teachers with the necessary confidence and pedagogical know-how to implement DST meaningfully (e.g., Gudmundsdottir & Hatlevik; Özüdoğru, 2021; Vivitsou et al., 2017). At the same time, the results confirm the positive impact of PDIs in enhancing teachers' openness to multiliteracies practices and increasing their willingness to integrate DST into their lessons (Tour & Barnes, 2022; Yu & Wang, 2025). Particularly in the post-pandemic context, these findings demonstrate the need for continued investment in OLTE to foster digital pedagogical innovation among language teachers (Cinganotto & Turchetta, 2020).

Overall, results show that the online PDI was effective in increasing teachers' awareness of their multiliteracies skills and reinforcing their positive beliefs about the educational value of digital tools to foster multiliteracies, while simultaneously promoting a more critical and informed approach to their integration in Italian FL classrooms. This evolution points to the



importance of sustained, reflective, and practice-oriented training in developing teachers' multiliteracies practices. However, findings suggest that while the PDI successfully raised awareness and intentions around multiliteracies, digital tools, and DST, translating this into consistent classroom practice remains challenging. Structural issues such as time, training, and institutional support, as well as student-related factors, continue to mediate the adoption of innovative pedagogical approaches. Nevertheless, teachers' increased openness to DST indicates a change in pedagogical orientation, which could be reinforced through further OLTE opportunities and systemic support. The perceived professional development in multiliteracies among teachers in this study aligns with studies showing that DST not only enhances digital and pedagogical competences, but also encourages teachers to critically re-evaluate their teaching beliefs and practices (e.g., Robin, 2006; Özüdoğru & Cakir, 2017). These findings are also consistent with research on OLTE, which emphasizes the value of structured and experiential training to foster changes in teachers' self-perceptions, beliefs, and teaching intentions (e.g., Powell & Bodur, 2019; Shin & Kang, 2018). Finally, the results confirm the distinction between teachers' perceived impact and actual instructional change (Borg, 2018; Farrell, 2007). This reflects broader challenges of OLTE programs, where the effectiveness of OTPD is influenced by factors such as teachers' existing competences, cultural backgrounds, and institutional contexts (e.g., Banegas & Manzur-Busleimán, 2014).

## 6. Conclusion

In the context of international efforts to advance teachers' multiliteracies and promote the 'digital turn' in language education, notably accelerated by the pandemic, this study examined the effectiveness of an online PDI including a focus on DST. Among its purposes, it explored changes in teachers' self-assessed multiliteracies skills, beliefs regarding multiliteracies, and multiliteracies practices over both short- and long-term periods. Involving in-service teachers of Italian FL working at various centers of the Dante Alighieri Society in Argentina, the research aimed to offer new insights into the role of OLTE in fostering multiliteracies through OTPD. The general objective was to contribute to the broader discourse on technology-enhanced language teacher education, particularly within underexplored and globally diverse educational contexts.

In sum, the online PDI contributed to a more critical and realistic understanding of multiliteracies among participating teachers, fostering professional growth while also exposing the persistent gap between pedagogical intentions and practical implementation in contextually constrained environments. Overall, the findings align with the conceptualization of the 'digital turn' in language education as both a challenge and an opportunity. While often complex and disorienting, this ongoing transformation presents considerable potential for language teachers who engage with multiliteracies through innovative pedagogical approaches and reflective practices. The longitudinal data highlight the continued need for targeted, practice-based OLTE programs, not only for pre-service but also for in-service teachers, to support the transition from initial exposure to the confident and autonomous integration of multiliteracies in everyday language teaching.

However, the study is not without limitations. These include the single-case study design and

lacked direct observations of DST implementation, largely due to geographical constraints. Data on multilingual practices were based solely on self-reported practices collected before the PDI, immediately after, and one year later.

Future research should address these limitations by incorporating more diverse data collection instruments, such as classroom observations, to better align self-assessment, beliefs, and reported practices with actual teaching behaviour. Including students' perspectives through questionnaires or focus groups would provide a more holistic view of the impact of online PDIs. Analyzing both teachers' DST activities and students' DST artifacts would further support data triangulation. Moreover, exploring the long-term institutional and systemic supports necessary for sustained multiliteracies practices could offer valuable insight into how these innovative pedagogical approaches may be adapted across diverse educational settings. Implementing these recommendations could enhance the understanding of the effectiveness of OLTE in promoting multiliteracies, ultimately informing the design of future training models that can ensure greater sustainability, contextual relevance, and pedagogical impact.

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## Note

Note 1. The conceptual development of this article is the result of authors' collaboration. Specifically, sections 4, 5, and 6 were written by Camilla Spaliviero, while sections 1, 2, and 3 are attributed to Graziano Serragiotto.

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