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Designing video-based lessons in Secondary School: an exploratory study in initial teacher education

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Abstract: Although educational videos have been widely examined in e-learning and flipped learning, their teacher-mediated use in classroom lesson design remains less explored. This exploratory study investigated how pre-service and in-service teachers enrolled in Italian initial teacher education programmes for secondary schools designed lessons incorporating digital video, with the aim of understanding their pedagogical choices, the quality of their lesson planning and their perceived competence. Adopting a mixed-methods design based on Bonaiuti's classroom video-use scenarios, the study drew on 1,025 questionnaires and a sample of 100 lesson plans selected for in-depth analysis. Quantitative data were analysed descriptively, while open-ended responses were examined through inductive thematic analysis. Results show that participants most frequently chose to use video at the beginning of the lesson, mainly to stimulate attention, interest and introduce content. YouTube was the dominant platform, with professionally produced videos. Video selection was primarily justified by clarity, content alignment and engagement. Overall lesson-design quality was positive, yet tasks directly connected to video viewing represented the weakest area. Self-assessed competence increased across all dimensions, especially activation tasks, although these remained the lowest-rated area. The findings highlight the need to support future teachers in turning video viewing into guided observation, discussion and re-elaboration.

Keywords: lesson planning; video; initial teacher education; secondary education

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1. Introduction

In contemporary educational contexts, video is an increasingly widespread resource in teaching and learning processes, partly because of the growing centrality of audiovisual languages in everyday cultural and communicative practices. The availability of digital videos and online repositories has made audiovisual resources easier to access, search, share and integrate into educational settings (Mayer et al., 2020). This has expanded the possibilities for using video not only as a source of information, but also as a resource for supporting different instructional functions: making visible phenomena, processes or experiences that are difficult to observe directly or convey verbally; supporting procedural and skills-based learning; contributing to the acquisition of declarative knowledge; and fostering students' engagement and interest (Bonaiuti, 2010; Cattaneo et al., 2019). In secondary school

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contexts, instructional videos have also been used to provide explanations, display historical footage, demonstrate abstract phenomena and prompt critical discussion (Fyfield, 2022). Studies conducted in secondary or second-level classrooms suggest that students value video for its motivational potential, its capacity to explain concepts and its ability to provide examples and real-world scenarios (Tiernan & O'Kelly, 2019).

However, the abundance of resources does not automatically correspond to pedagogical quality, since online videos may vary considerably in relevance, reliability and instructional value (Fyfield, 2022). Moreover, video should not be treated as a self-evident or merely illustrative resource: as a complex multimodal text, it requires contextualisation, guidance and mediation in order to support meaningful learning (Pentucci, 2016; Giaconi et al., 2023). The teacher's role is therefore central, not only in selecting appropriate resources, but also in exploiting the classroom affordances of digital video, such as isolating short excerpts, pausing, replaying, slowing down or combining clips with other materials to support observation, discussion and analysis (Bell & Bull, 2010). These affordances require intentional pedagogical use: video content needs to be aligned with instructional goals, students need guidance on what to observe, and viewing should be connected to clarification, discussion and assessment activities (Bell & Bull, 2010; Tiernan & O'Kelly, 2019). These competences are also emphasized in the DigCompEdu framework, which includes both the critical selection of digital resources and the design of teaching practices that appropriately integrate digital tools and resources to support learning (Punie & Redecker, 2017).

The paper presents an exploratory study conducted within the Italian university-based initial teacher education programmes for secondary teachers, established by the Prime Ministerial Decree of 4 August 2023. Although digital video can be used in education through different forms of production and fruition involving both teachers and students, this study focuses specifically on lessons in which teachers select and integrate existing video resources into classroom instruction. Drawing on Bonaiuti's model for the intentional use of video in classroom teaching, the study focuses on teacher-designed video fruition within face-to-face lower and upper secondary school lessons. Participants were invited to design a subject-specific lesson incorporating at least one digital video within one of three scenarios: video at the beginning of the lesson, video after the teacher's explanation, or video integrated during the lesson as part of a progressive instructional sequence (Bonaiuti, 2010). The study therefore does not examine video as a stand-alone resource for self-instruction, flipped learning or e-learning, but as a resource whose educational value depends on its guided integration into teacher-led classroom instruction.

2. Materials and Methods

2.1. Study design, participants and data collection

A mixed-methods research design (Creswell & Plano Clark, 2007) was employed to provide the most comprehensive analysis possible, incorporating both quantitative and qualitative data. This allowed emerging trends in the use of video for teaching purposes to be identified, as well as the specific characteristics of lesson plans developed by participants to be analysed.

The study had five main objectives:

OB1. Explore which scenarios for the use of digital video are preferred by teachers when designing active instructional activities for secondary school students, and analyse the pedagogical motivations behind these choices;

OB2. Analyse which video formats and digital platforms are selected in relation to the various usage scenarios, and identify the reasons underlying these design choices;

OB3. Assess the consistency between the learning objectives and the instructional strategies developed in the designed video-based sequences;

OB4. Examine the consistency between the stated video usage scenario and the methodological framework of the proposed instructional design;

OB5. Explore the perceived level of competence in planning lessons that incorporate digital videos.

The study was offered to 9,473 teachers enrolled in initial teacher education programmes at *eCampus Telematic University*. Of these, 1,065 teachers (approximately 11% of the total population) agreed to participate in the study on a voluntary basis. The resulting group therefore constitutes a non-probability sample. Nevertheless, it can be considered adequate for providing an exploratory overview of participants' perceptions and instructional design choices, without claiming to produce generalisable or statistically representative results. The study was conducted during the synchronous sessions of the course *Metodologie e Didattiche Innovative* held in April 2026, included in the curriculum of the three qualifying pathways for secondary teachers (Allegato 1: 60 CFU; Allegato 2: 30 CFU; Allegato 5: 36 CFU). First, participants attended a theoretical lecture focusing on the educational potential and functions of digital technologies, and the use of digital videos to support active learning. Based on this foundation, participants were then invited to design a subject-specific lesson lasting 60-120 minutes for a lower or upper secondary school class. Participants could choose one of the three video-based scenarios outlined (Bonaiuti, 2010).

Participants completed the task using a template that was specifically designed to provide structured guidance throughout the planning process. The template was organised into five sections, each of which addressed a different component of the lesson design (Terrenghi & Triacca, in press). The five sections guided participants through the design process, from defining the educational context and learning objectives (Sections A, B) to selecting and integrating the video within the instructional sequence (Sections C, D), and finally reflecting on the pedagogical choices made (Section E).

A qualitative-quantitative analysis grid was developed to enable an in-depth analysis and evaluation of instructional designs. It is structured according to the study's objectives and the format used by the participants. The tool includes a descriptive component which aims to identify the main contextual elements of the designs and selected video resources, and to assess overall compliance with the guidelines. Additionally, it features an evaluative component that primarily focuses on analysing the quality of instructional designs. Specifically, the assessment panel consisted of four dimensions: (D1) formulation and consistency of learning objectives; (D2) selection of the video resource and the corresponding pedagogical rationale; (D3) consistency of the video integration scenario; and (D4) structure of the instructional sequence, paying particular attention to the integration of the video

and the presence and quality of related tasks. Each dimension is broken down into specific indicators, which are evaluated on a three-level scale to give a maximum total score of 24 points. Based on the scores assigned through the coding process described in Section 2.2, each design was classified into one of the following four descriptive categories, which were defined to concisely express the design quality level: Low (0-8 points); Basic (9-14 points); Good (15-19 points); High (20-24 points).

Alongside the instructional design task, participants were invited to complete a questionnaire developed specifically for the study and administered via Google Forms. It combined closed- and open-ended items to collect contextual information and the link to the lesson plan produced using the provided template, as well as additional data on participants' previous experience with video, how they typically use video in their teaching practice, how competent they perceive themselves to be at integrating video into instruction, and how difficult they found the different stages of the design task. The questionnaire concluded with a reflective question designed to ascertain whether participants' approaches to using video for instructional purposes differed from their usual teaching practices.

2.2. Dataset preparation and analysis

A unique identification code was initially assigned to each of the 1,065 submissions in order to enable consistent tracking across the different stages of data cleaning, link verification, archiving and analysis. To ensure data quality and consistency, a Google Sheets script was implemented to automatically detect duplicate submissions and verify that the lesson plan links shared by participants were active and accessible. The output generated by the script was then manually reviewed to validate its accuracy and identify any remaining inconsistencies. After this verification process, all accessible lesson plans were downloaded and systematically archived, creating a validated dataset ready for descriptive and qualitative analysis.

After data cleaning and the removal of duplicate submissions, the survey yielded 1,025 valid questionnaires, which were used for the descriptive analysis of participants' responses, and 865 lesson plans. Of these lesson plans, 458 met the criteria for qualitative analysis, as they were accessible, non-duplicated and contained enough information to analyse the selected scenario, the video resource and its integration into the instructional sequence. A subsample of 100 plans was then selected for in-depth analysis through proportional stratified random sampling, in order to preserve the distribution of the analyzable corpus across two variables: educational programme (Allegato 1, Allegato 2, Allegato 5) and school level (lower and upper secondary) (see Table 1).

The subsample of 100 lesson plans was coded independently by two researchers using the analysis grid described in Section 2.1. The two coding sheets were then compared in order to identify convergences and discrepancies. Initial independent coding showed agreement on the final quality category in 79 cases; the remaining 21 cases, together with minor scoring discrepancies within the same category, were discussed jointly until agreement was reached. A final agreed coding was then produced and used for the descriptive and interpretive analyses presented in Section 3.

Quantitative data were analysed descriptively, while qualitative data from open-ended responses were examined through inductive thematic analysis, using multi-label coding when responses contained more than one relevant meaning unit. AI was used as a support tool for organising quantitative outputs and assisting the semantic aggregation of qualitative responses. All AI-assisted outputs were reviewed, validated and, where necessary, refined by the researchers, who retained full responsibility for final coding, categorisation and interpretation.

Table 1. Sampling matrix.

Pathway	Lower Secondary School	Upper Secondary School	Total
Allegato 1 (60 CFU)	13	20	33
Allegato 2 (30 CFU)	24	31	55
Allegato 5 (36 CFU)	4	8	12
	41	59	100

3. Results

This exploratory study has gathered a rich and varied dataset offering multiple perspectives for analysis. This section will present the most relevant data, organised according to the study's objectives. The data relate to a sample of secondary school teachers with prior experience of using video. Most participants reported being familiar with using video in everyday life, with 61.4% indicating that they often or always use videos as a learning resource. Video use was frequently reported across all three instructional integration scenarios identified by Bonaiuti (2010), particularly when video is used to introduce a teaching sequence.

3.1. Scenarios

All figures and tables should be cited in the main text as Figure 1, Table 1, etc. The study primarily aimed to explore which digital video scenarios teachers preferred when designing active teaching activities, and analyse the pedagogical motivations behind these choices. Of all the completed questionnaires, nearly half of the teachers (around 47%) opted for the first scenario, involving the use of video at the start of the lesson. The second scenario, in which the video is shown after the explanation, was selected by around 28% of participants, while the remaining 24% opted for the third scenario, which involves integrating video into the teaching sequence.

This distribution is also reflected in the 100 lesson plans sampled. Among these, the majority of participants work in upper secondary schools (see Table 1) and, in terms of subject, the most common area was foreign languages (29%), followed by humanities (history and geography) (20%), technological and laboratory-based subjects (20%), mathematics and science (18%), and other subjects including arts, physical education and civic education (13%).

At the lower secondary level, the choice is fairly evenly split between the first (40%) and second (37.5%) scenarios. At the upper secondary level, however, there is a more pronounced preference for the first scenario (54.2%), followed by the third

(27.1%) and second (18.6%) one. Some interesting descriptive trends also emerge with regard to subject areas. Scenario 1 is particularly common in foreign languages (65.6%), while Scenario 2 is more prevalent in humanities subjects such as history and geography (47.8%). Scenario 3 is more prevalent in mathematical and scientific subjects (32.0%) and technical, technological, and vocational subjects (38.5%).

Considering the reasons behind the choice of scenario, the analysis revealed specific "scenario-related" interpretative categories. These categories show that there is a high level of consistency between the pedagogical function assigned to the video and the instructional design choices made by the participants.

Taking the 89 valid responses into account, the video in Scenario 1 is primarily conceived as a trigger to capture attention, arouse interest, and introduce new content in a more accessible way. One teacher, for example, described this approach as enabling students to *"build knowledge starting from observation"* rather than from abstract theoretical explanation (VBL0450). In Scenario 2, many teachers emphasise the importance of providing information, prerequisites or interpretative tools prior to viewing the video. From a learning support perspective, however, the video's main function is to consolidate and mediate learning by reinforcing knowledge and clarifying content. Someone stated that the video functions as *"a consolidation tool rather than a simple introduction"*, reducing the risk of passive viewing (VBL0618). In Scenario 3, the video is considered an integral part of the teaching sequence, maintaining dynamism and attention while facilitating progressive learning, interaction, discussion and active participation. As one participant explained, the integrated scenario makes it possible to *"alternate explanation, observation and discussion, maintaining attention and fostering progressive understanding"* (VBL0601).

3.2. Video formats and digital platforms

The second research objective was addressed through the analysis of the 100 lesson plans included in the in-depth sample, focusing on the types of videos and digital platforms selected by participants and on the pedagogical reasons underlying these choices.

Informative videos were the most common format, accounting for 30% of the sample, followed by video lectures (15%), film excerpts or trailers (12%) and animated videos (10%). Other formats were less frequent: screencasts (7%), documentaries (6%), tutorials or procedural videos (5%), oral, musical or artistic performances (5%), dialogues or simulated communicative situations (2%), and experiments or demonstrations (2%). The remaining categories each accounted for 1% of the sample and included book summaries, interviews, social content, and montage videos. In two cases, the video format could not be identified.

In terms of platforms, YouTube was by far the most frequently used source, featuring in 82% of lesson plans. In 8% of cases, participants selected videos from the HubScuola channel, which offers specific educational resources for schools. Other platforms were considerably less represented: RAI resources (RAI Play, RAI Scuola) were used in 7% of cases, digital textbook or editorial platforms in 5%, streaming platforms in 3%, TED in 1%, and other sources in 1%. In one case, the platform could not be identified. This strong prevalence of YouTube confirms its role as the most accessible and familiar repository for educational video selection, but it also raises the issue of teachers' ability to critically evaluate the reliability, appropriateness and instructional value of open online resources.

Regardless of the platform used, most selected videos came from professionally produced, editorial or institutional sources. When considered together, these categories accounted for 72% of the sample. User-generated content represented one quarter of the selected videos (25%), while in the remaining cases the source was either not indicated or not identifiable.

The motivations for video selection were collected through an open-ended question, without predefined response categories or minimum length requirements. As a result, participants' answers varied in length and level of pedagogical elaboration. They were analysed using a multi-label coding scheme; frequencies refer to the number of lesson plans in which each criterion was identified.

The analysis of participants' motivations showed that video selection was mainly justified in relation to clarity and explanatory structure (n = 64), followed by declared alignment with lesson objectives or disciplinary content (n = 46). Engagement and attention were also recurrent criteria (n = 32), together with visual, auditory or multimodal support (n = 27) and appropriateness for the target class or accessibility (n = 27). Less frequently, participants referred to the manageability of the resource, such as brevity or segmentability (n = 21), its connection with authentic or real-world contexts (n = 20), or its capacity to make processes, procedures or experiences observable (n = 16). Criteria related to the use of the video for activation, discussion or task support (n = 15), and to source reliability or authority (n = 12), appeared less systematically. Finally, in 10 cases the motivation was either generic or not interpretable.

In addition to the criteria mentioned, the pedagogical rationale for video selection was evaluated using the rubric indicator described in the analysis grid. Scores ranged from 0 = absent or not assessable, 1 = weak, 2 = adequate, to 3 = articulated and pedagogically grounded. Most motivations were rated as adequate (n = 43) or articulated and pedagogically grounded (n = 34), while 15 were rated as weak and 8 as absent or not assessable.

Overall, these data suggest that participants mainly selected videos for their perceived clarity, usefulness and capacity to support students' understanding, while more specific pedagogical criteria, such as task design, source reliability and the observation of otherwise difficult-to-access processes or experiences, were less frequently made explicit.

3.3. Overall quality of lesson designs

With regard to the third and fourth research objectives, the qualitative analysis of the 100 sampled lesson plans focused on their internal consistency. This involved examining the alignment between learning objectives and teaching strategies (OB3), as well as the alignment between the stated scenario and its actual implementation within the teaching sequence (OB4).

Regarding the first objective, the 100 analysed lesson plans present a positive overall picture: 72% of the objectives are formulated with an adequate level of clarity and observability (a score of 2 on a scale of 0 to 3). This percentage falls to 66% when considering consistency with the target group and the overall teaching proposal (D1). A significantly more positive picture emerges when considering the structure of the teaching sequence (D4): 94% of lesson plans demonstrate an adequate level of clarity, organisation, and sustainability in terms of teaching phases and strategies. Over half of these plans (55%) fall into the highest category (score 3).

Overall, therefore, the results seem to indicate greater strength in the operational structuring of activities than in the formulation and full alignment of learning objectives.

However, in terms of consistency between the stated scenario and its actual implementation, 96% of designs achieve at least an adequate level, with 72% falling into the highest assessment category (D3). These percentages fall when considering the quality of the video's integration into the teaching sequence (86% at adequate or high levels) and, to an even greater extent, the quality of the associated task (61%). Overall, 57% of lesson plans achieve an adequate level across all three of the aforementioned indicators, which suggests an increasing difficulty in transitioning from correctly implementing the scenario to designing pedagogically meaningful activities that are directly linked to the video.

The overall assessment of the 100 designs, based on the total score obtained in each dimension of the analysis grid (see §2.1), paints a predominantly positive picture. Specifically, 27 designs achieved a high standard of quality, while 30 achieved a good standard. This places a total of 57% of projects in the top two categories. A substantial proportion, 32 designs, are classified as meeting the minimum quality standard, while only 11 fall into the low-quality category.

3.4. Video formats and digital platforms

The fifth objective concerned participants' perceived competence in designing active instruction with digital videos. The analysis was conducted on the 1,025 valid questionnaires and considered five dimensions before and after the training activity: selecting video platforms, identifying relevant video characteristics, aligning the video with lesson objectives, integrating the video into the selected instructional phase, and designing video-related tasks for class activation. For each dimension, participants rated their perceived competence on a four-point scale from 1 = not at all competent to 4 = very competent. Results are reported by aggregating the two highest levels of the scale (3+4).

As shown in Table 2, participants reported an increase in perceived competence across all five dimensions. The largest increase concerned the design of video-related tasks for class activation (+25.1 percentage points), although this remained the lowest-rated dimension after the training activity.

Table 2. Participants reporting fairly or very competent self-ratings before and after the training activity (N = 1,025).

Dimension	Pre-training	Post-training	Δ pp
Platform selection	76.1%	91.3%	+15.2
Video characteristics	77.5%	91.7%	+14.2
Objective alignment	82.8%	92.2%	+9.4
Instructional integration	74.5%	92.3%	+17.8
Activation tasks	60.2%	85.3%	+25.1

To further interpret this shift, the open-ended questionnaire answers of the 100 participants included in the in-depth lesson-plan analysis were examined. Participants were asked how they would describe their approach to using video in teaching after the lesson, compared with before. The most frequent theme was greater awareness and intentionality (n = 39). Several participants described a shift from video as an accessory or illustrative support to video as a resource to be intentionally integrated into the instructional sequence. For example, one participant moved from considering video as an *"accessory support"* to seeing it as *"a real teaching tool, to be strategically integrated into the lesson"* (VBL0206). Another described a similar shift from video as an *"explanatory support or element of engagement"* to video as *"a teaching tool to be carefully designed"* (VBL0281). Others stressed that the aim was not simply "watching a video" but using it as *"a starting point for subsequent activities"* (VBL0505) or described video as a *"catalyst for cognitive processes"* rather than a mere *"container of information"* (VBL0586). A smaller group of answers expressed continuity or confirmation of previous practice (n = 16), suggesting that for some participants the lesson mainly helped to systematise or make explicit competences they already perceived as present.

4. Discussion and conclusions

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted. The study's findings offer several points for reflection on the pedagogical and curricular choices that guide the integration of videos into secondary school teaching. The combination of quantitative and qualitative data makes it possible to identify key issues, which are discussed in light of the relevant literature and their potential implications for initial teacher education.

A key point is the pedagogical significance that teachers attribute to their choice of scenario for using the video. Qualitative analysis of their motivations reveals that the choice between the three scenarios is not solely determined by time or organisational considerations, but rather reflects different pedagogical intentions, as proposed by Bonaiuti (2010). In fact, the data suggest that the choice of scenario is more likely to be interpreted as a deliberate methodological and didactic decision than as a mere matter of timing. For example, Scenario 1 is chosen to stimulate student interest and draw on their prior knowledge, Scenario 2 is used to clarify and consolidate learning, and Scenario 3 is preferred as a learning pathway that alternates between explanation, observation, and interaction.

This focus on the pedagogical context of video implementation also seems to be reflected in the selection of audiovisual resources. Participants generally justified their choice of videos based on relevant criteria such as clarity of presentation, consistency with the subject matter, and the ability to promote students' understanding and engagement. Even the strong reliance on YouTube did not necessarily imply the use of informal or user-generated content, as most of the selected videos originated from professionally produced editorial or institutional sources. These initial observations suggest that attention is paid not only to the intrinsic characteristics of the resource, but also to its potential to support learning processes.

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However, integrating videos into teaching can be more challenging. The educational value of a video depends on more than just the suitability of the resource itself; it also depends on how it is incorporated into the lesson, how students are guided before, during and after viewing, and how it is connected to learning objectives and student activities (Pentucci, 2016). From this perspective, lesson planning involves more than just selecting a relevant video and placing it at a specific point in the lesson. It requires the deliberate pedagogical integration of the audiovisual resource (Hobbs, 2006) and activities that support student engagement, processing, and knowledge construction (Seo et al., 2021).

The design of video-related activities represents a particularly significant issue. In participants' reasons for selecting video resources, references to student activation, discussion or specific tasks were less frequent than references to clarity, usefulness and engagement. This trend is consistent with both the participants' initial self-assessments, which identified the design of engaging tasks as the area of greatest weakness, and the assessment of the micro-projects, in which only 61% of work achieved an adequate or high standard in this respect. The convergence of this evidence suggests that it may be difficult to translate the recognised educational potential of video into activities that promote active engagement with the content. This issue is also emphasised in the literature as being important for learning (Bell & Bull, 2010; Zhang et al., 2006). In this respect, the increase in participants' perceived competence is encouraging. Questionnaire results show an increase in self-assessments across all the dimensions considered, particularly in task design aimed at engaging students (+25.1 pp). Since these are self-reported data, they do not allow us to infer an actual improvement in design competence. Nevertheless, their relevance increases when considered alongside the open-ended responses, which suggest that the training helped some participants reconsider the role of video. Several responses described a shift from video as a supplementary or marginal support to video as a resource to be intentionally connected to learning objectives, student activity and active participation.

These findings have important implications for initial teacher education. Training activities should not focus solely on helping future teachers select appropriate videos, but also on supporting them in designing coherent video-based learning sequences. This involves making explicit the criteria for selecting and evaluating audiovisual resources, analysing examples of lesson plans, designing activities before, during and after viewing, and reflecting on the alignment between scenarios, video resources, learning objectives and assessment strategies. Particular attention should be paid to video-related tasks, since they are crucial for transforming the pedagogical potential of video into opportunities for observation, discussion and active knowledge construction. More broadly, supporting future teachers in critically revising their instructional design choices may contribute to the development of reflective professional practice (Harris et al., 2009).

In conclusion, despite the exploratory nature of the study, the use of a non-probability sample and the fact that the analysis was based on lesson plans developed within a single training activity, the findings highlight a meaningful distinction between recognising the pedagogical potential of video and translating this awareness into coherent instructional design choices. While participants generally showed an understanding of the pedagogical functions of audiovisual resources, greater difficulty emerged in designing activities aimed at promoting

active learning. This is a particularly significant finding given the existing gap in the scientific literature, which has focused more on using videos in online learning contexts or flipped classroom models. Exploration of the ways in which such resources are integrated into face-to-face teaching practices has been relatively limited (Fyfield, 2022). Further research could therefore examine the relationship between teaching intentions and actual teaching practices through observing video uses in authentic school contexts. This would make it possible to explore the consistency between planned and implemented activities, the mediation strategies adopted by teachers, the forms of student participation and the contribution of video-based activities to the learning process in greater depth.

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