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Analysing collaborative learning with DOTEbase

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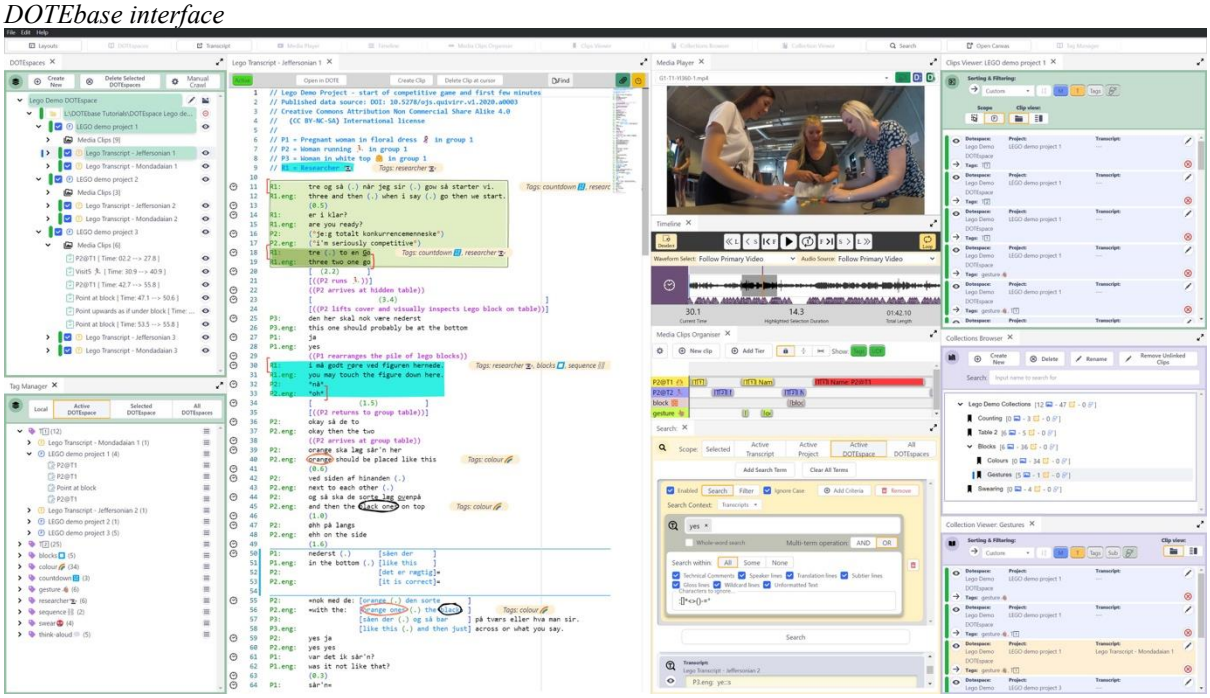
Abstract: In CSCL research, audiovisual data plays a central role in understanding collaborative learning processes and fostering methodological advancements, such as the Mondrian transcription charts and multimodal learning analytics. DOTEbase is a powerful tool designed to support the systematic analysis of rich audiovisual datasets, empowering researchers to gain deeper insights into complex learning interactions. This interactive demo introduces participants to the core functionalities of DOTEbase, including transcript annotation, media clip creation, and visual mind-mapping through an intuitive canvas interface. Aligned with the ISLS Annual Meeting 2025 theme, DOTEbase facilitates creative knowledge practices, collaborative inquiry, and ecosocial innovation by enabling dynamic exploration of learning environments. Attendees will engage in hands-on demonstrations, explore a case study, and have discussions about methodological applications in their research contexts. The session will also offer opportunities to provide feedback and suggest future improvements, fostering dialogue on the evolving needs of CSCL research and research-practice partnerships.

Introduction

In CSCL, audiovisual data has been a central part of many studies—both for gaining access to CSCL practice (Davidsen & Ryberg, 2017; Krange & Ludvigsen, 2008; Lymer et al., 2009; Stahl, 2006; Steier et al., 2019) and for developing new methodological tools, such as the Mondrian transcription charts (Shapiro et al., 2017) and multimodal learning analytics (Sellberg & Sharma, 2024). DOTEbase (McIlvenny et al., 2024) builds upon this legacy by offering a cutting-edge platform for qualitative analysis of audiovisual data in collaborative learning environments. With DOTEbase, researchers can seamlessly integrate, annotate, and analyse complex datasets, enabling deeper insights into learning interactions and fostering innovation in educational research. DOTEbase is an add-on application to the transcription software DOTE (McIlvenny et al., 2022) extending the options for doing audiovisual qualitative research.

Figure 1
DOTEbase interface



DOTEbase (see Figure 1) is particularly relevant in light of the ISLS Annual Meeting 2025 theme, which emphasises imaginative solutions to global challenges, active agency, and creative knowledge practices. As educational research continues to evolve, the ability to analyse and visualise learning processes in rich, multimodal

ways is critical for understanding and fostering transformative learning experiences. Through this interactive demo, participants will explore how DOTEbase supports such endeavours, offering powerful tools for the systematic investigation of learning practices.

Main features of DOTEbase

DOTEbase is a dedicated desktop software developed by BigSoftVideo to support qualitative analysis of large and complex audiovisual datasets. Designed with the needs of researchers in mind, it offers a robust environment for managing, annotating, and analyzing multimedia data, whether before or after transcription. DOTEbase integrates seamlessly with DOTE, allowing users to leverage transcripts stored locally on the same machine or accessible via external drives or remote file systems. The software continuously maintains a local snapshot of all indexed transcripts, automatically updating this cache in the background. This ensures uninterrupted workflow by allowing researchers to access cached data even when external drives are temporarily offline. Should a connection issue occur, the snapshot can be reconstructed once the drive is reconnected, ensuring data integrity.

A distinctive feature of DOTEbase is its ability to generate media clips directly from audiovisual recordings (see Figure 2), even before transcription is completed. Researchers can tag and organize these media clips across tiered timelines within individual projects or add them to shared clip collections for later retrieval and analysis. Furthermore, DOTEbase introduces a novel spatial visualization approach with its Canvas tool, which enables users to create visual mind maps and organize clips in ways that reveal patterns, relationships, and temporal structures in their data. This interactive and visual approach to qualitative analysis not only enhances data exploration but also facilitates collaborative sense-making and iterative research processes.

DOTEbase supports native desktop installation on Windows 10/11 and macOS systems, including compatibility with Apple Silicon devices featuring M-series processors. The focus on desktop environments ensures high performance when working with large datasets, which would not be feasible on smartphones or tablets. By consolidating media, transcripts, and annotations within a unified and flexible interface, DOTEbase represents a significant advancement in tools for qualitative research, offering researchers a comprehensive platform to explore, annotate, and visualize complex learning and interaction phenomena.

Case: Using DOTEbase to research collaborative VR

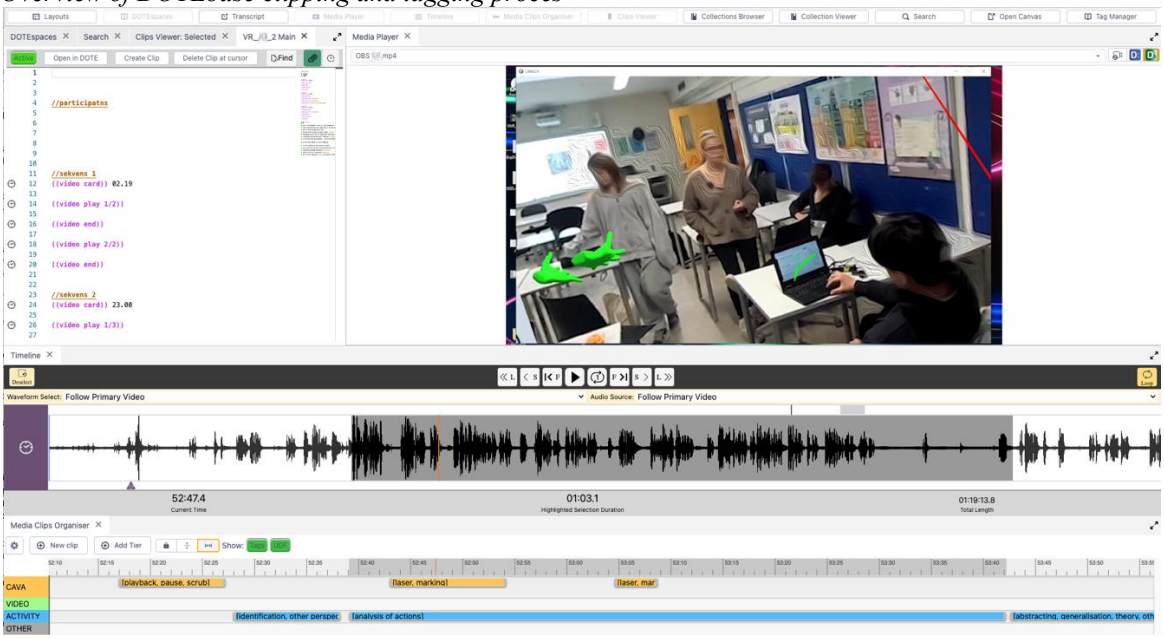
To illustrate the application of DOTEbase, we present a study showing how DOTEbase can support the systematic analysis of complex collaborative learning interactions (Paulsen & Davidsen, 2024). In this study, we focused on examining collaborative problem-solving among novice teachers and more experienced teachers engaged in technologically mediated learning activities. In the study teachers are working with 360-degree video recordings of the novice teachers' own teaching in collaborative immersive Virtual Reality (VR), analysing classroom interactions in order to support novice teachers in analysing, developing, and refining classroom management strategies.

By employing DOTEbase, we were able to work with large audiovisual datasets, enabling a fine-grained analysis of interactions over time, focusing on both verbal and non-verbal interactions. Video recordings from 5 mentoring sessions where teachers collaboratively analyse classroom interaction were imported into DOTEbase, totalling to over 4 hours of video data.

The aim of the study was to map out the different phases of the teachers' collaborative problem-solving during the VR-mentoring sessions. DOTEbase was utilized to create and organize media clips, allowing us to annotate key moments in the teachers' problem-solving processes, see Figure 1.

Figure 2

Overview of DOTEbase clipping and tagging proces



In Figure 2, a transcript from DOTE (McIlvenny et al., 2022) is imported on the left. In this case, the transcript is used for showing that the major sequence of events has been mapped out with DOTE timestamps. In the VR-mentoring sessions teachers are working with 3-5 video clips from the novice teacher's teaching. In the transcript, timestamps are made for when teachers begin working with each clip throughout the session.

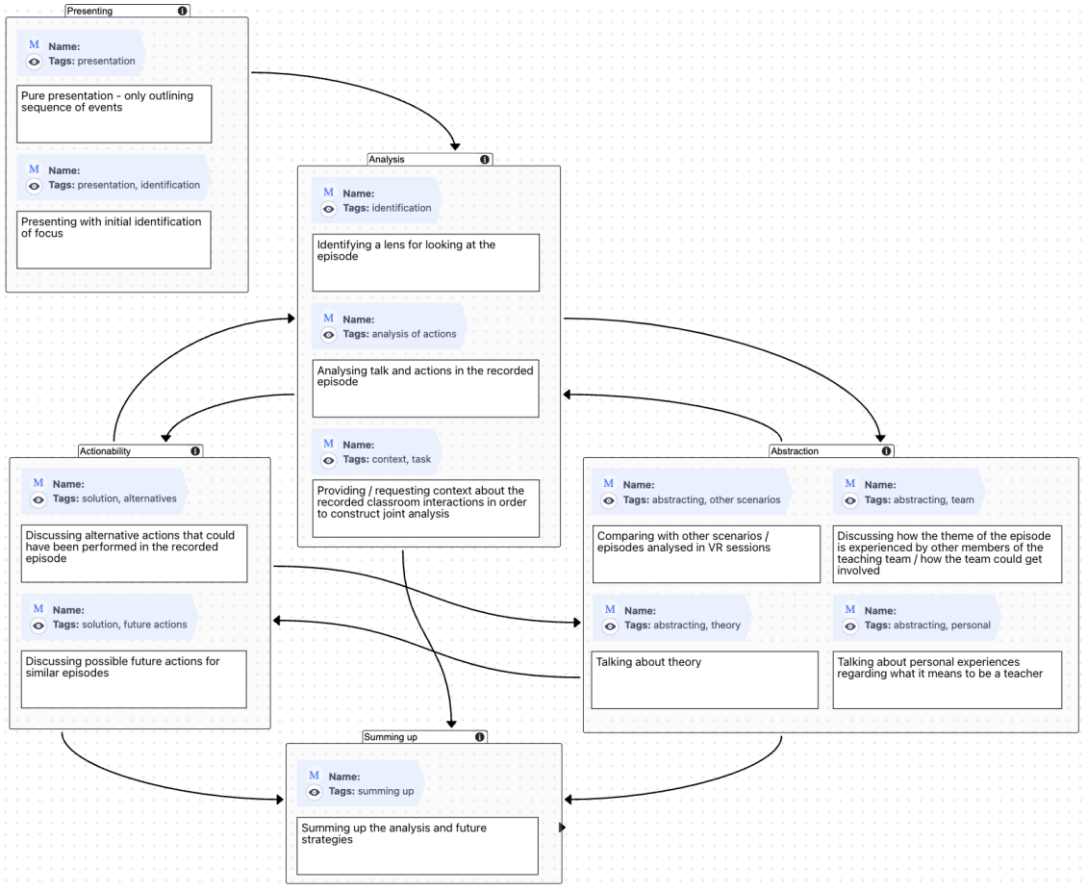
On the right, the video player is visible (Figure 2). Users are able to toggle through different pre-synchronised video feeds in the top of the player. In our study, we had recorded each participants point-of-view from inside the VR-space as well as a recording of participants as viewed from outside VR in the physical co-located space where the session took place.

In the bottom of Figure 2, below the waveform on the timeline, media clips are created in different tiers. In this study, the aim was to map out the activity, which can be seen through the highlighted blue clip, where a 1-minute section of the video is being tagged as 'analysis of actions' on the Activity-tier. As can also be seen in the Media Clips Organiser, it is possible to create clips on multiple tiers. In the orange tier, participants' tool use in the VR environment is being coded, e.g. through the clip tagged with both 'laser' to show that the laser pointer is being used (see the green line over the laptop in the recording on figure 1), and 'marking', for showing how the laser is used. In total, 856 clips were created across the four tiers in the annotation of the 5 VR mentoring sessions. The process of creating and tagging clips allowed for an analytical exploration of the recorded collaborative problem-solving process. By using DOTEbase the richness of audiovisual data could be retained, supporting the analysis of how participants dynamically construct meaning and negotiate shared understanding using both talk and action. This approach allows for capturing the complexity of learning processes more comprehensively, particularly in contexts such as multi-user VR, where spatial and embodied dimensions are integral to analysing learning from an interactional perspective.

Returning to the goal of mapping out the teachers' collaborative problem-solving process, 402 tags were assigned to the clips created on the activity tier, with the possibility of adding more than one tag to each clip. The tagged clips from the Activity-tier were grouped and categorised into thematic clusters, facilitating the identification of patterns and critical transitions in the teachers' collaborative efforts.

In the process of grouping and categorising clips, the visual canvas in DOTEbase helped to map out sequences of interactions, making it easier to identify potential connections between categories of clips (Figure 2). In Figure 3, the Visual Canvas can be seen. In the iterative and inductive tagging and grouping of clips from the Activity-tier, 5 themes emerged. Some themes only contained one primary tag, e.g. participants summing up the analysis and future strategies only contains the tag 'summing up'. Other themes were grouped themes, e.g., the theme 'Alternatives' containing both clips with the tag 'alternatives' as well as 'future actions'. As outlined in the study, a linear movement was identified from presenting a clip to summing up the knowledge, with a non-linear, iterative movement between analysis, abstraction, and actionability in between (Paulsen & Davidsen, 2024).

Figure 3
Visual canvas in DOTEbase for organising clips



The identification of this movement was made possible by sending clips to the visual Canvas, grouping them, and then identifying links between groups by looking at the order in which groups appeared on the timeline / activity-tier for each analysed episode during VR sessions. This case illustrates how DOTEbase's flexible and intuitive design can enhance methodological rigor in CSCL research, enabling researchers to move beyond traditional transcription methods and towards more dynamic, interactive analyses, preserving the temporal, spatial, and embodied dimensions of the data.

Structure of the session

Participants in the demo will experience:

- Hands-on exploration of DOTEbase: Attendees will engage with key features of the software, including transcript annotation, media clip creation, and interactive mind-mapping using the visual canvas.
- Interactive discussion on methodological approaches: Participants will be invited to discuss how DOTEbase can be used in their research contexts, including collaborative knowledge-building and ecosocial innovation projects.
- Feedback and future development: Attendees can provide feedback on the tool and suggest new features or improvements, fostering a collaborative dialogue about future needs in the learning sciences.

The demo aligns with the conference's focus on research-practice partnerships by showcasing how DOTEbase can bridge the gap between academic inquiry and practical application. By enabling researchers and educators to co-create and analyse complex artifacts, DOTEbase supports the development of solutions tailored to practitioners' needs.

This session is ideal for researchers working with audiovisual data, educators interested in innovative methodologies, and technologists developing tools for educational research. Join us to see how DOTEbase can enhance your research and contribute to the field of CSCL.

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