

SIG2 Video Based Research, Meeting notes and Annual General Meeting Minutes

19 - 20 September 2024, Hybrid

The members of SIG2, met hybrid, hosted by Jaume Amettler and Alba Cortés, in the University of Graz over two days (19 & 20 September) to discuss research, share ideas and collect thoughts on past and future activities of the SIG.

Attendances varied on a day-by-day basis and included: Kathrin Otrell-Cass, Anna Major, Anna Ruechel, Melanie Gürentz, Olena Beskorsa, Eman, Sharaf, David Weiler, Iris Mendel, Christina Lechner, Estelle Blanquet, Katharina Düsing, Andrée Tiberghien, Jaume Amettler and Alba Cortés

1. SIG Meeting

We started **Thursday, 19th September**, with a get-together and share meal.

We had a discussion on the following topics:

- The differences about the pre-service teacher's educators between countries, the efforts to respond to the changing times and the ideas that not only literature but contextually should shape teaching education.
- The experiences in making a PhD programme.

On **Friday, the 20th of September**, we started the symposium “The Role of Visuality in Science Education” with a presentation by Kathrin Otrell-Cass:

Video Case Archive UniGraz

The scholarly pursuit of enhancing teacher education and pedagogical research in science education is presented in the "Stories from Schools" project, a collaborative initiative predominantly involving Austrian educational institutions. The project has laid the foundation for the pioneering Austrian video case archive—a repository of authentic classroom teaching episodes aimed at supporting the qualitative facets of teacher training and teaching research, particularly within the sphere of science education. The video case archive comprises curated video recordings that encapsulate a spectrum of different teaching scenarios drawn from diverse class levels, school types, and subjects, each illuminated by varying thematic emphases. These visual narratives provide a prism through which aspiring educators and teacher educators, alongside researchers, can critically engage with the intricacies of pedagogical praxis. Through reflective observation, stakeholders are able to scrutinize the multifaceted dynamics of classroom interaction. Complementing the illustrative power of these videos, we offer supporting materials, including detailed transcripts and relevant work materials, to augment the depth and utility of the archive. Recognizing the sensitivity of educational environments and the sanctity of participant consent, the project observes stringent ethical standards to ensure the respectful treatment and privacy of all recorded individuals. The aims of the "Stories from Schools" project is encapsulated in its strategic

approach, which embraces three cornerstone considerations: (a) Selection, the project uses criteria for the extraction of meaningful segments from the complex recordings of classroom environments, (b) Analysis, which outlines the methodologies recommended for educators and student teachers to dissect, interpret, and collaboratively engage with video content for maximal pedagogical benefit, and (d) Ethics, which contemplates the establishment of protocols governing video utilization and reuse, thus safeguarding the agency and rights of the research participants within the recorded educational milieu.

Some of the topics we discussed included:

- The use of a video case archive to respond to our community's needs.
- The ethics behind keeping an archive and the access given to researchers to the videos.
- How to tag videos to use them as a resource for pre-service teachers and how these resources should not only contain a contextual record to understand what we see in the video, but the necessity of suggesting prompts to use the videos with a clear intention.

Next there was the presentation by David Weiler:

Nested Video Vignettes – New Ways for Teacher-Education

Professional vision is one of the most important competences for in-service teachers. Video vignettes of lessons can be used to train professional vision during the teacher training programme (Müller & Gold, 2023; Seidel & Stürmer, 2014). The importance of video vignettes is also reflected in the increasing popularity of video vignettes in research and teaching (Seidel, 2022). This format of teacher training offers a great opportunity, especially for the scientific and technical subjects, as the professional vision of topics like the typical preconceptions among learners can be trained through video functions such as repeated viewing as a scaffolding. Although it is already possible to interact with the videos and there are many projects that use this form of video (Junker et al., 2022), the linear format also has its limitations. As a result, the level of autonomy is low due to the pre-structured nature of the videos, even though the experience of autonomy is an important motivational factor in learning (Deci & Ryan, 2000). One way to counter this is with nested video vignettes, such as those created in the VidNuT project (German acronym for: Video vignettes in science, technology and textiles). In these videos, learners have the opportunity to make decisions during the course of the video that influence the further plot of the video. In addition, the learners have the opportunity to adopt different perspectives in the classroom through the scenes filmed from different angles. The videos were created on the basis of a script with real pupils at German-speaking schools. Subtitles are also available in other languages, such as English. The talk presents the design and possible applications of nested video vignettes, as well as preliminary feedback from students.

Some of the topics we discussed included:

- Decision paths to train pre-service teachers in professional vision
- How a scripted video can promote learning professional vision and the ideas that we need to consider in writing such scripts
- Understanding the role of language and dialogue in writing scripts and resources to make them consistent with students' way of communicating.

The following presentation was by Eman Sharaf:

The Effectiveness of Introducing Comics into Science Textbooks to Reduce Stress Level during Learning

Emotions play an important role in the learning process, and positive emotions have a positive effect on students' learning. The Yerkes-Dodson Law, a model of the relationship between stress and task performance, shows that performance is generally best when stress is moderate. From this point on, the student's stress level needs to decrease and reach its average level in order to complete a better learning process. The aim of this project is to create and present comics about energy that will reduce students' stress levels, which have a positive effect on their learning. The project consists of two parts, starting with an initial study aimed at investigating students' emotions towards images of energy topics used in different Austrian schoolbooks. During the time the images were displayed, students' stress levels were measured using two electrodermal activity (EDA) sensors and students were asked to record their emotions using the SAM questionnaire. The results showed that more than 95% of the images produced more than the normal average stress level of students, and 22% produced very high stress. In the second part of this project, pre-post-test experimental/control group designs was used to investigate the impact of learning about energy through comics on students' stress levels. In this regard, two new versions of comic books were created by the researcher and presented digitally to 44 students in grades 8-12 in Egypt, all under the same climatic conditions. They all completed the pre-test before the intervention (4-2) weeks and the post-test immediately after the intervention. Each student wore a Moodmetric smart ring to measure their stress level. One-way ANOVA and repeated measures ANOVA were calculated to analyse the stress levels. The result was that there was a significant difference between the mean stress levels of the comic and text groups in favour of the comics.

Some of the topics we discussed included:

- Ways of understanding how cartoons can change the way students learn according to an expected level of stress
- The use of video consent forms instead of written consent forms.
- The ethics in voicing a cartoon with students' ideas or voices.

Annual General Meeting (Hybrid) presented by Alba Cortés:

The topics of the AGM were:

- Welcome and report from the SIG coordinators
- SIG2 pre-conference seminar: Do we want a SIG2 seminar just before the start of the ESERA conference in Copenhagen? If so, what should the focus be?
- ESERA Keynote speaker: Possible SIG2 suggestions to the ESERA board for the ESERA 2025 conference
- The SIG2 invited symposium: our plans
- SIG2 member discussion: why and how should we share visual data (ethical issues concerning video research in education, such as transparency in sharing visual data or addressing the requirement of research ethics committees).

Some of the topics we discussed included:

- After talking about the possibility of working on something together (Kathrin), where we could discuss the different facets of video research as a topic (David) in order to make a call for a special issue (Jaume), we agreed that we would like a pre-conference symposium that would focus on what video research is, The aim is to showcase part of the community so we can work on a joint position about the facets of video research (ethics, technology, analysis, etc.). The Sunday before the start of the ESERA 2025 Conference, we should be meeting for this pre-conference symposium. Details about it will be sent later.
- On the topic of possible Keynote speakers, we agreed on two possibilities: Christina Siry and Sarah Pink (proposed by Kathrin). Both names were sent to the ESERA Board to be taken into consideration for the next Conference.
- Four presenters from different countries will be chosen for the invited symposium. Katharina made the connection between the topic of the ESERA Conference 2025 and the topic for the symposium in Graz; this led us to talk about maintaining the topic of the role of visuality for the invited symposium, with a focus on visuality for the transition and transformation. The proposals should aim to the work of visuality for teacher (David) and Student (Eman) education, learning and research.
- The last point of the meeting was the ethical discussion. Initially, we recognised that there is a difference in ethical codes between countries (David), so it can be complex to reach a statute that respects the particularities of how these codes are thought of. However, we can identify that there are aspects that we observe internationally (Jaume), not only in the legal aspects but also in the requirements that publishers request for the publication of results. In this way, we proceeded to discuss the aspects that we should take care of at an ethical level regardless of the country of origin since even in countries with few restrictions; we need a standard as a research community and the application of these considerations (Kathrin). This led to a discussion of how we honour the agreements we make with our research participants and how we safeguard our video data, especially thinking about the future and how artificial intelligence might affect our work and challenge our ethical codes.

The following presentation was by Katharina Düsing:

Using videos to open the black box of scientific research processes

The development of scientific reasoning competencies (SRC) and epistemic beliefs (EB) are a central goal in science education since they have been linked to students' learning and are relevant to participate in public discussions. However, approaches to promote SRC and EB often either do not provide insights into authentic research or do not address the research process explicitly. This is problematic because it prevents students from gaining insights into scientific ways of thinking and working, and SRC and EB cannot be fully promoted through learning opportunities in which the research process remains hidden (black boxing). To address this problem, the present project developed and evaluated videos that use authentic cases to communicate research findings embedded in the research process. Videos are developed and tested in four variants that differ in whether the research process is addressed implicitly or explicitly and whether insights into consideration processes and reflections of nature of science aspects are provided. The research questions are: To what extent does

explicitly addressing the research process using videos with authentic cases promote SRC and EB? What effect do insights into consideration processes and reflections of nature of science aspects have on SRC and EB? The research procedure involves a pre-post design with intervention in the form of an out-of-school student lab day (Dependent variables [DV]: SRC and EB; independent variables [IV]: Video variants). The assignment of students to the conditions is done by randomization at the individual level, with students always being assigned to one video variant. The sample includes secondary school students (Grades 10-13) from SH and NRW, Germany. The presentation will provide insights into the systematic development of the videos and into the first empirical study. In addition, educational implications and implications for further research will be discussed.

Some of the topics we discussed included:

- What video can give us that is not possible with other approaches.
- The ways presenting students with the realities of doing science as a scientist can change the ways a student understands the research process.
- The relations between the presentation and David's presentation.
- The ways we can change students' scientific practices and their epistemic beliefs.

Lastly, a presentation by Estelle Blanquet:

Utilizing 360° Videos to enhance Teacher Training in Early Science Education

The presented project addresses the critical need to enhance science education in early childhood (3-6 years old) by empowering teachers with innovative teaching approaches, specifically utilizing 360° videos. With a focus on the Nature of Science, this project aims to foster engaging learning environments that stimulate curiosity and critical thinking through the analysis of in situ situations filmed in classrooms. Indeed, the teaching plan that we propose to work on aims to equip future and in service teachers with the necessary skills to implement scientific criteria in their practices.

Researchers suggest that immersive technologies, provided with authentic and contextualized learning experiences, can enhance training (Gobin-Mignot & Wolf, 2020 ; Milgram, Takemura, Utsumi, & Fumio, 2020 ; 1995) The benefits of virtual immersion in education are varied: it offers variety to teaching methods, encourages situated learning, facilitates transfers to professional environments... (Dunleavy & Dede, 2014 ; Mellet-d'Huart, 2021, Walshe & Driver, 2019; Theelen, van den Beemt & den Brok, 2019). Moreover, research shows that interacting with these technologies stimulates student engagement and motivation, and improves knowledge acquisition (Slater, 2017; Bower et al., 2020). Regarding 360° video, it is considered a effective tool for assessing professional engagement, providing future teachers with immersive experiences closer to reality (Roche & Rolland, 2020 ; Qian, Shang & Qin, 2023). The potential of interactive video as a learning tool seems to be a real enabler, emphasizing its role in actively engaging students and improving cognition and attention (Altinpulluk, 2019; Merkt & Schwan, 2014). However only few studies focus on a specific subject-matter (Roche, Rolland & Cunningham, 2023), and fewer on science education (Tan, Wiebrands, O'Halloran & Wignell, 2020).

The project focuses on bridging theory and practice in early science education. By providing hands-on training using immersive technologies (360° videos) it aims to contribute to the

professional development of educators and the betterment of teaching and learning experiences. Introducing explicit criteria of scientificity usable for both children and teachers might be an new and more efficient approach for fostering inquiry-based learning and critical thinking in young children in the French context at least (Blanquet & Picholle, 2017). As many French teachers lack the necessary training to efficiently teach the scientific inquiry in their daily practices, the use of 360° videos as a training tool aims to offer firsthand experiences and practical insights on integrating scientific criteria into early childhood science education.

Some of the topics we discussed included:

- The use of online platforms for analysing video data and the ways we can use them for teacher training.
- The difference between the affordances of a single camera and a 360 camera is to learn from what happens in the classroom.