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Enhancing school-based mentors' professional practice: Exploring 360° video and virtual reality as tools for self-observation

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Abstract

Observing oneself and one's own practice on video is a powerful tool that mentors can use to further develop their skills. The purpose of this study is to explore how mentors experience using VR technology and 360° video as observation tools in a mentor conversation in which they themselves act as mentors. Based on a reflexive thematic analysis, qualitative interviews with five mentors were analyzed and categorized into three main themes: (a) being present in one's own supervision, (b) being an autonomous observer, and (c) gaining an expanded observational perspective. Compared to the use of video in 2D format, the results show that VR technology and 360° video provide an educational added value by strengthening mentors' opportunities to see themselves and the person they mentor from different perspectives. These technologies also expand mentors' basis of observation, encompassing interactions, relationships, and the impact of mentors' words and actions on the mentee.

Keywords: Mentor development, professional mentoring, 360° video, observation tools, mentor education.

Introduction

Mentoring is crucial for the professional development of students and graduates in various professional education programs, including teacher education, in which school-based teacher educators and mentors play a vital role in ensuring the success of pre-service and newly qualified teachers in the classroom (Clarke et al., 2014; Hobson et al., 2009). However, it is not only pre-service and newly qualified teachers who rely on guidance and professional development but also the mentors themselves (Parker et al., 2021). Previous studies have shown that using video as an observation tool can enhance mentors' ability to identify, reflect on, and improve their professional practices (Bjørndal, 2012; Körkkö et al., 2019). In the context of university-based mentor education aimed at further developing school-based mentors' competencies, video technology can add pedagogical value, as it provides mentors with expanded observation opportunities (Fransson & Holmberg, 2022). In recent years, there has been an increase in studies related to what is collectively referred to as "virtual reality perspective-taking" (Barbot & Kaufman, 2020; Young et al., 2022). In this strand of literature, VR technology is described as a tool for

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taking on different perspectives. Specifically, it is argued that the technology has the potential to enhance users' empathic abilities by allowing them to observe themselves from another person's perspective through embodied experiences (Han et al., 2022; Lucifora et al., 2023). Despite the understanding of the importance of mentors' ability to see themselves and their mentees from different perspectives, we are not aware of any studies that have investigated how mentors experience using VR technology as a tool for observing their own professional practices. Against this backdrop, the purpose of this study is to explore the potential of VR technology as a tool for observation, and how school-based mentors experience the use of VR technology in relation to their role as observers of their own professional practice. Hence, this study is an important contribution to examining the educational value and potential of VR technology as an observation tool for mentors. We will address the following research question: *How do school-based mentors experience using 360° video and VR technology as a tool to observe their own professional practice?*

In this study, we used VR technology commonly referred to as "cinematic VR," which is described as videos filmed with a 360° camera (Rothe et al., 2019). Compared to computer-generated environments, 360° videos have technical limitations in terms of facilitating tactile interaction and physical mobility. While viewing a 360° video using VR goggles, the user is "stuck" at the point where the 360° camera was originally placed. Consequently, it is not possible to explore the surroundings beyond turning 360° around that point, and there are different opinions on whether viewing these videos falls under the VR concept (Archer & Finger, 2018). We do not intend to discuss the terminological significance of the VR concept in this article and will henceforth refer to the combination of 360° video and VR goggles as "VR360° technology."

Literature review

Video as an observation tool

Several studies have shown that mentors and educators who observe their own practice on video find that the technology strengthens their ability to advance their professional practice (Broman, 2014; Kang & van Es, 2019; Major & Watson, 2018; Tunney & van Es, 2016). The obvious strength of using video as an observation tool is the opportunity it provides to view oneself and the situation from an outsider's perspective. According to Bjørndal (2012), mentors who attended a university-based mentor education program in Norway made a number of realizations after gaining experience with video observation; through their previous observations from an insider's perspective, the mentors had a limited, and sometimes inaccurate, image of themselves in interaction with the mentee. The mentors explained that watching video recordings of their own mentoring practice helped them become more self-aware because they could observe vulnerable aspects of themselves with their own eyes, as well as detailed and unnoticed patterns in their interactions.

Previous studies have also shown that it is not uncommon for mentors to have excessive trust in their own observations from an insider's perspective and that they can be surprised to discover that sometimes the mentees have differing perceptions and perspectives on the mentoring conversations (Bjørndal, 2008; Bjørndal, 2009). One of the reasons mentors may find it difficult to observe and reflect on their own practice is due to the complexity of a mentoring conversation (Gordon & Brobeck, 2010). Remembering what has been said and the details of the conversation and interaction can be difficult for the participants. In other words, the context can make it challenging for mentors to be self-aware and evaluate whether a conversation has been helpful or not (Bjørndal, 2012).

The mentors' positive experiences of using video in their professional development are reflected in schoolteachers' experiences of observing their own practice from an outsider's perspective. In studies conducted in the context of pedagogical professional development, teachers considered observing themselves and their own pedagogical practice on video to be one of the most valuable opportunities to discover, change, and further develop their own practice (Borko et al., 2008; Tripp & Rich, 2012a). Using

video as a tool for observation can support teachers' professional development by deepening their reflections on their own competence and practice (Magnusson et al., 2023). Furthermore, studies have demonstrated that teachers who use video recordings to identify their own strengths and weaknesses become more self-aware and that observation and reflection on their own teaching practice can help them narrow the gap between what they believe is good teaching and how they actually teach (Rich & Hannafin, 2008; Tripp & Rich, 2012b). Compared to other methods of feedback, it seems that using video to observe and identify areas needing improvement from an outsider's perspective may have greater significance in determining whether the observer changes their practice (Tripp & Rich, 2012b).

Observation of video recordings also plays a significant role in the professional development of pre-service teachers. In a scoping review of various tools used in the mentoring of pre-service teachers during their school practicum, Nesje and Lejonberg (2022) found that all included studies highlighted the advantages of using video. These benefits are related to the different advantages that technology provides for observing and reflecting on one's own practice. Additionally, the review underscores certain challenges and technical constraints of using video as an observation tool. For example, the chosen view of reality shown in a video is partial and can exclude the viewer from accessing important elements related to the overall situation (Körkkö et al., 2019). However, advancements in VR technology emerges as a promising solution, enabling viewers to observe a broader scope of their surroundings within recorded videos (Rueda & Lara, 2020).

Virtual reality

The use of VR in education has rapidly increased in recent years (Huang et al., 2023; Kavanagh et al., 2017), and studies demonstrate how the technology can enhance the learning process by offering rich opportunities for observation (Fromm et al., 2021; Lie et al., 2023). In teacher education, the integration of 360° videos has been shown to intensify pre-service teachers' sense of being present in a situation, offering a more nuanced understanding of their microteaching and support their self-efficacy (Gold & Windscheid, 2020; Walshe & Driver 2019). Furthermore, research suggests that VR simulations can be a controlled and perceived safer environment for professional development compared to real-life situations such as classroom interactions or parent conversations (McGarr, 2021; Tavares & Somby, 2023).

Historically, VR refers to three-dimensional and computer-generated environments designed for user interaction (Rueda & Lara, 2020). Interaction with the environment is a key characteristic of VR technology because it can give users a sense of "being there." In other words, VR technology has the technical capacity to create virtual but convincingly realistic environments while removing the user from their physical surroundings (Sanchez-Vives & Slater, 2005). This technical capacity is referred to as "immersion" enables users a sense of being physically and mentally present in the virtual environments created by the technology (Bailenson, 2018; Rueda & Lara, 2020; Slater, 2009). When users can naturally move their bodies, such as turning their heads to interact with the virtual environment, their brains tend to make the simple inference that what is perceived is the user's surroundings (Slater & Sanchez-Vives, 2016). This illusion of "being there" is commonly referred to as "presence" or "place illusion" (Slater, 2009). Through VR technology, this bodily and mental presence can foster a sense of involvement and connection to the virtual environment, contributing to the user's engagement with the content. This engagement, in turn, influences the impact of the virtual experience on the user (Wiebe et al., 2014).

Studies have indicated that these central aspects of VR fundamentally differentiate the technology from other media in terms of how we are bodily and mentally affected. For instance, social content presented in a 360° video has been found to evoke positive emotional responses among viewers (Pavic et al., 2023) and according to an early study, approximately one in ten individuals chose to leave a cinema when a "fire" occurred in a VR viewing (Spanlang et al., 2007). Furthermore, research conducted by Slater et al. (2013) indicate that individuals are more inclined to intervene in a virtual fight if they feel a personal connection or identification with one of the parties. While anyone can experience a racing heart or discomfort from watching a fire or a fight on a 2D screen, it is unlikely that they would choose

to flee the screen or physically intervene. Thus, VR emerges as a potent technology capable of shaping our perceptions of reality. The environments created by the technology, along with the psychological responses of the users, allow VR to provide us with credible experiences that encompass both real-world scenarios and ones that are unlikely or simply impossible to experience in the physical realm (Slater & Sanchez-Vives, 2016).

Perspective-taking in VR

According to Spencer et al. (2020) mentors' capacity for empathy and ability to adopt a mentees perspective is critical for fostering effective mentoring relationships. Furthermore, Bjørndal (2012) argues that a crucial aspect of mentor competence development involves opportunities for introspection and to "meet oneself" through methods like video observation, which enable mentors to scrutinize their mentoring practices from various perspectives. The technical capabilities of VR technology make it possible to facilitate users' experiences of authentic situations from another person's perspective (Theelen et al., 2022).

In 2015, filmmaker Chris Milk was the first to refer to VR as the "ultimate empathy machine" (Milk, 2015), after he used VR360° technology to create a documentary that enabled viewers to "be present" with a 12-year-old girl in a Jordan refugee camp (Milk & Arora, 2015). The aim was to enable people to immerse themselves in context and emotions of others, and thus develop empathy for them (Milk, 2015). A study from 2017 confirmed the assumption that such an immersive VR experience can have an impact on the empathic response of the user (Schutte & Stilinović, 2017). The results indicate that participants who watched the specific documentary from the refugee camp in VR experienced greater engagement and higher levels of empathy for the girl compared to the control group, who watched the same film in a 2D format. The authors argued that the pivotal factor in linking the VR experience with an empathic response lies in the users' engagement. They asserted that this engagement serves as a driving force behind the process, ultimately suggesting that the technology has the potential to impact interpersonal emotions, including empathy. Other studies confirm this potential, providing evidence that the immersive experiences and emotions triggered by VR can evoke empathic responses, even in real-life scenarios (Han et al., 2022; Herrera et al., 2018; Lucifora et al., 2023).

Barbot and Kaufman (2020) propose that VR technology holds significant promise for nurturing users' empathic dispositions, particularly when it enables them to embody another person's perspective autonomously. One way to accomplish this is by having VR users become avatars of other people. In a recent study, pre-service teachers became avatars of pupils in VR and gained experience of what it is like to be pupils when facing challenging situations (Stavroulia & Lanitis, 2023). The study revealed that the pre-service teachers felt a strong sense of embodiment within the pupils' virtual bodies and perceived the situations from their viewpoints as if they were the pupils themselves. The study concluded that the pre-service teachers' VR experiences helped strengthen their empathy and understanding of how pupils might feel in various situations, prompting deeper reflections on diverse scenarios from the pupils' perspectives. Hence, research findings on VR indicates a pedagogical added value when it comes to foster perspective-taking and empathy.

Methods

Participants and procedure

A strategic sample of five school-based mentors was recruited for this qualitative study. At the time, the mentors were enrolled in a university-based mentor education program in Norway and had minimum 10 years of work experience from school or kindergarten. All participants had recently completed Level 1 in their education (15 study credits) and had fresh experiences using 2D video recordings as observation tools to analyze their own mentoring practice.

In this study the participants conducted an individual mentoring conversation with a pre-service teacher, concerning a pedagogical issue addressed by the mentee. The conversation was filmed using a stationary 360° camera (Garmin VIRB 360) positioned at eye level between the participating mentor and the mentee. The camera position made it possible for the participants to observe both the mentee and "themselves" in VR from a face-to-face perspective. A 15-minute recording was made for each mentoring session, and the 360° camera was operated remotely to avoid unnecessary attention to the technical setup. After the session, the video file was transferred to VR goggles (Oculus Quest 2). The participants received a brief introduction to the technical functioning of the VR goggles and accompanying controllers and watched the recording of the conversation as a 360° film. To facilitate the participants' ability to rotate around their own axes, they sat on a rotating office chair while watching the film. In that way, they were able to sit down and observe while also being able to move their bodies effortlessly. They decided how many times they wanted to watch the recording and how long they wanted to explore the technology.

To explore the participants' immediate experiences of using VR360° technology as a tool for observation, we conducted individual, semi structural interviews after the recording and viewing through VR goggles (Brinkmann & Kvale, 2018). Based on a broadly formulated research question, the questions in the interview guide were open-ended, allowing for in-depth exploration through clarification and specification (Creswell & Guetterman, 2019). The purpose of these questions was to invite the participants to share their experiences and reflections on using VR360° technology as an observation tool. The participants' contextual knowledge and previous experiences allowed them to effectively communicate rich and varied information about their experiences (Malterud, 2017).

Data analysis

The interviews were recorded with an audio recorder and transcribed verbatim by one of the participating researchers to enhance the validity of the study (Malterud, 2017). The data underwent reflexive thematic analysis to identify patterns of meaning and latent themes across the dataset (Braun & Clarke, 2021). To structure the flexible process of analyzing the data, we followed the recommendations outlined in Braun and Clarke's (2021) framework. Therefore, we (1) familiarized ourselves with the data and noted initial impressions, (2) systematically coded the data, (3) generated themes from the codes and data, (4) developed and reviewed the themes, and (5) refined, defined, and named the themes.

During reflexive thematic analysis, the analytical work of coding the data is an integrated part of developing themes (Braun & Clarke, 2021). To identify meaningful patterns to develop codes and themes, we iteratively moved between various steps throughout the entire process. Listening to and transcribing the audio recordings was an important part of familiarizing ourselves with the data. By reading the transcriptions we gained an impression and overview of the entire dataset. We specifically looked for patterns within the participants' experiences and identified 72 quotes throughout the dataset. During the coding process, the quotes were eventually reduced to 49 organized into nine codes. In the process of developing codes and themes, we created an analysis map to structure and specify the data (Table 1). The content of the map changed throughout the process as we defined, refined, and adjusted the codes and themes.

The codes and themes developed in this study reflect the participants' experiences, thoughts, and reflections related to using VR360° technology as a tool for observation. This means that the design of the study was primarily inductive, and the empirical material helped shed light on the research question (Braun & Clarke, 2021). However, it is important to note that the data were not analyzed in a theoretical vacuum. The descriptions of the participants' experiences, thoughts, and reflections are not unbiased, in the sense that they were influenced and constructed by the participants themselves and by the researchers throughout the process (Malterud, 2017).

Theme A			**Theme B**			**Theme C**		
Being present in one's own supervision: the experience of «being there» and seeing the whole from an outsider's perspective			Being an autonomous observer: the experience of being able to move around, choose perspectives and focus			Gaining an expanded observational perspective: the experience of being able to observe interpersonal phenomena		
Code 1	**Code 2**	**Code 3**	**Code 4**	**Code 5**	**Code 6**	**Code 7**	**Code 8**	**Code 9**
Being part of the surroundings	Positioning in the room	Observe the whole situation from an outsider's perspective.	Choosing perspective and focus	Physical movement	Physical and technical challenges	Interaction	Relationship	Effect on others
Quotes from the transcriptions of the five interviews (translated from Norwegian)								
You feel like you are sitting there. Even though it is yourself you are looking at.	Now I was allowed to sit in the middle and see both sides of a mentor conversation.	Being the fly on the wall and seeing that there was more happening throughout the conversation.	There is no one else determining where you should look or where your gaze should fall, you can decide for yourself.	What it [VR] does is that you can turn around so you can capture all angels, all things, and get a good picture from all sides, so to speak.	I notice that sometimes you must turn around a bit faster to not miss anything.	It is much easier to grasp if it all fits together.	Being able to see oneself in interaction with others is something i find interesting to do.	It becomes a bit easier to observe, perhaps, what is happening and what kind of effect, in a way, the way I am as a mentor.

Table 1: Excerpt from the analysis map and results. The map shows themes, codes, and quotes.

Research ethics

In this study, we, as researchers, also served as lecturers in the university-based mentor education program in which the participating mentors were enrolled. This dual role introduces some potential risks that needs to be addressed. Our pre-existing relationship with the informants may have influenced the data collection process, potentially leading to biased responses due to unequal power dynamics wherein informants may feel compelled to respond favorable or hesitate to express critical feedback (Dwyer & Buckle, 2009). To ensure that the participants were able to respond impartially during the interviews, the challenge of the dual role was addressed. The mentors were interviewed one by one, and the interviews were conducted after the final examination. Despite these challenges, our participatory roles as researchers can also be considered a strength, allowing us a deeper understanding of the context and facilitated access to nuanced insights that serve as valuable analytical resources (Braun & Clarke, 2021). Furthermore, it seemed that our established relationships with the informants played a role in fostering rapport and trust, thereby legitimizing our role as researchers. The data collection was approved by the Norwegian Agency for Shared Services in Education and Research (Sikt). All participants received an information letter on how the data would be collected and stored securely, signed a consent form, and had the opportunity to withdraw from the study at any time. In the Results section, the participant's identities are anonymized to ensure confidentiality. The quotes have been translated from Norwegian,

and some of them have been edited to increase readability by removing redundant phrases, repetitions, and hesitations.

Results

Based on the analysis, we categorized the findings into three main themes: (a) being present in one's own supervision, (b) being an autonomous observer, and (c) gaining an expanded observational perspective. The three themes relate back to the study's research question and collectively provide a comprehensive picture of the results of the thematic analysis. Each theme is distinct yet also clearly connected to the others and can be seen as logically dependent on each other in terms of content. Below, we describe each theme in detail and follow Braun & Clarke's (2021) recommendations regarding reflexive thematic analysis by including the use of quotes from the data material to illustrate our analytical descriptions and assumptions.

Being present in one's own supervision

A recurring theme present in all the interviews was the participants' descriptions of feeling present as observers in their own mentor conversations. All participants referred to the virtual environment created by VR360° technology as a place where they entered and stayed, together with "themselves" and the mentee. For example, one participant stated, "It was exciting to enter the mentoring atmosphere in a completely different way [...]. Now I was allowed to sit in the middle and see both sides of a mentor conversation." Another participant mentioned that the technology allowed them to "Be in the room, *in* [emphasizing "in"] what was happening."

In addition to describing the virtual environment created by VR360° technology as a place they entered, all participants expressed a sense of being part of these surroundings as observers. One participant articulated this by saying, "You feel like you're sitting there. Even though it's yourself you're looking at." Despite their expression of a sense of being present as observers in the virtual environment, it became apparent that the participants did not perceive themselves (in the role of observers) as actively participating in what was unfolding. One participant stated:

> Instead of being a part of the mentor conversation, I was somewhat outside the conversation and were allowed to observe what was happening [...]. I didn't need to contribute anything [...] just observe what was happening.

Linguistically, it seemed challenging for the participants to describe how they both experienced being part of the virtual environment while not actively participating in what was happening there. Several participants used metaphors in their attempts to describe this "passive presence." One of them said, "you feel like you're sitting as a spectator next to them," while another stated that "it's as if you're sitting as a third party in the room." A third participant described the experience of seeing the mentor conversation from a fly's perspective. The metaphors clearly describe the role of a passive observer while also including a sense of being present and observing from a specific perspective and location in the room. Regarding the fly metaphor, the participant said, "I was allowed to be the fly on the wall and see that there was more happening in the entire conversation." Another participant highlighted the positive aspect of observing from a different perspective and that it was a nice experience to "just observe what was happening."

Although the 360° camera filmed from a point between the participating mentor and the mentee, none of the participants appeared to have felt that they embodied the mentee. When asked about how they experienced observing themselves from the perspective of the mentee, one of the participants responded with the question: "You mean from my perspective in VR?" In other words, the participant did not interpret the immersive VR environment as a place where they "met" themselves by "being" the mentee. Based on the participants' descriptions, there is no reason to believe that the other participants interpreted their role in the environment any differently. There is also no indication that the mentors

embodied "themselves" in VR and experienced "re-meeting" the mentee. One participant, for example, stated, "I managed to detach myself from the fact that it was me sitting there."

Being an autonomous observer

Despite all participants describing their observer role as passive in the immersive virtual environment, they also experienced themselves as active in the sense that they could choose the perspective and focus on what they wanted to observe. One participant described this experience of being an autonomous observer as follows: "No one else has decided where you should look or where your gaze should fall; you can decide that yourself. And I think that's exciting. That I am allowed to decide what I want to observe." Another participant said, "I can choose to look only at the student and his expressions, and then I can choose to look at myself and my expressions." The participants connected the experience of being able to choose where and what they wanted to observe to the technical capacity of the technology, which allowed them to physically interact with the virtual environment. One participant explained this as follows:

> When you are in the three-dimensional, you can see it from multiple angles [...]. You sit and watch the person speaking, and if you suddenly decide in the moment that you want to see how the other person is behaving right now, you just turn 180° in the chair.

None of the participants had previous experience with watching a 360° film using VR goggles, and four of them had never worn VR goggles before. One participant noted that moving in a virtual environment was an unfamiliar experience for them:

> As soon as I entered, I was a bit locked into seeing myself. Then I realized, hey, I can actually turn around. [...] It took a bit of time because you're so used to just seeing one place, so I had to take a few turns to see the whole room.

The participants generally viewed the autonomy to choose perspectives and focus as a positive aspect of VR360° technology. However, they also encountered challenges in synchronizing their physical movements with what they wanted to observe in the film. One participant, for example, said, "I notice that sometimes you have to turn a bit faster, so you don't miss anything."

Gaining an expanded observational perspective

The third and final overarching theme we constructed concerned the participants' experience that the technology provided them with an expanded observational perspective when it came to observing interactions between themselves and the person they were mentoring. When asked how VR360° technology differs from observing a mentor conversation in a 2D video format, one of the participants characterized the experience as follows: "I believe it becomes a bit easier to observe what is happening. And what kind of effect, in a way, the way I am as a mentor. What kind of effect I have on the mentee."

All participants highlighted that the technology enabled them to observe interactions and effects in a new and different manner compared to their previous experiences of observing from an outsider's perspective in 2D, or from an insider's perspective during actual mentor conversations. One of them said, "It is much easier to grasp if it fits together," while another stated that the technology allowed them "to see multiple things at the same time." The participants connected the new observation opportunities to the technical capacity of the technology to facilitate the experiences described in the two previous themes: the experiences of being (physically and mentally) present and freely choose perspective and focus. One participant described the connection between observation opportunities and experiences as follows:

> I could decide, okay now I'm going to look at him and see what kind of expression he has [...] and then it became real in a way. So, you could see if it matched, and, well, here we weren't quite on the same wavelength!

The observation opportunities described by the participants also relate to the technical capacity of the technology to convey the feeling of "being there" and, at the same time, being able to step out of this

experience by pausing or rewinding. One participant attempted to explain this experience as follows: "And it happens in real time. You can pause if you want, but then you must press two buttons on the controller in your hand." Another suggested that the technical capacities of the technology could contribute to expanding the basis of observation, in allowing the viewer to observe what they called a "micro-level," regardless of whether they were physically present or not:

> Even if you weren't present, you can see exactly what they were talking about, how they reacted with facial expressions [and] body language in a completely different way than you could've done [...] even if you were present.

Despite all participants experiencing that the technology provided them with an expanded observational perspective compared to the possibilities in the 2D format and the physical world, they were not exclusively positive about the potential they saw in the technology. One participant stated that they did not necessarily think that the technology was a better observation tool when it came to (solely) observing themselves: "It's more that you can see multiple things at the same time." Several participants also expressed that the technology would likely have greater pedagogical value in more dynamic settings than in a mentor conversation between two individuals. One participant, for example, believed that in the context of mentoring a group, the technology would have an even greater effect in terms of expanding observation opportunities: "There [when mentoring a group] I must focus on the one speaking. And *then* [emphasizes "then"] it would be interesting to see the others."

Three of the participants also highlighted the possible added value of the technology as a tool for observation prior to a mentor conversation. One said that they could imagine using the technology in observation-based mentoring to observe what is happening in the classroom and then use it in a mentor conversation with the person who was observed. Another commented that, used as an observation tool prior to mentoring in classrooms or in kindergarten, "it would provide a completely different picture and material to mentor from."

Discussion

The purpose of this study was to examine how school-based mentors experience using VR360° technology as a tool to observe their own professional practice. We investigated the experiences of mentors enrolled in a university-based mentor education program using VR360° technology as an observation tool during a mentor conversation with a pre-service teacher as part of their effort to develop their professional mentor competence and practice. In this way, we gained insights into the pedagogical potential of the technology in supporting mentors' professional development. Compared to observations through a 2D video format, our findings suggest that VR360° technology offers significant pedagogical added value by providing the mentors' an expanded observational perspective. The technology enhances mentors' opportunities to view themselves and the mentee from various perspectives by creating an immersive environment. Based on their experiences with the technology, the participating mentors also highlighted possible added value in contexts such as group mentoring and observation-based mentoring.

The findings indicate that VR360° technology provides mentors a sense of presence as observers in their own mentor conversations. This finding is consistent with prior research showing that the technology has a technical capacity (immersion) to create virtual environments where users can experience mental and physical presence (Rueda & Lara, 2020; Sanchez-Vives & Slater, 2005). However, VR360° technology also has technical limitations in terms of tactile interaction and mobility, which can weaken the user's sense of presence and spatial illusion (Archer & Finger, 2018; Slater, 2009). Nevertheless, this limitation does not seem to have detracted from the mentors' immersive experiences in this study. Rather, the results suggest that VR360° technology has effectively reshaped the mentors' perception of reality.

The mentors reported experiencing being present in their own supervision without being an active part of what was happening between "themselves" (in VR) and the mentee. In their accounts, they used

metaphors such as being a “fly on the wall” and a “spectator” to describe an autonomous but non-participatory observer role. The mentors' ability to physically interact with their environment by turning their heads and selecting what they wished to observe and focus on seemed to reinforce their perception of their roles. This phenomenon aligns with findings from previous studies indicating that the sense of “being there” is strengthened when the user can naturally move their body in the virtual environment (Slater & Sanchez-Vives, 2016). Some studies have even provided examples of individuals being so physically and mentally immersed in VR experiences that they feel compelled to flee from a simulated fire or intervene physically in a fight (Slater et al., 2013; Spanlang et al., 2007). Our data did not reveal any inclination among the mentors to intervene at any point in the unfolding situations within the virtual environments generated by VR360° technology. One plausible explanation for this is that the nature of the study context, which involved observing a mentor conversation wherein the participants assumed the role of mentors, lacked elements of surprise or unexpected events, thus mitigating the need for intervention by the mentors.

One final important finding relates to the participating mentors’ engagement with an autonomous but non-participatory presence and how this affected their observational capabilities. The mentors were asked to compare the observation opportunities created by VR360° technology with those provided by the traditional 2D format. The findings indicate that the sense of presence created by VR360° technology facilitated an expanded observational perspective concerning the dynamics of interaction, relationship, and the impact of their words and actions on the mentee. In other words, it seems that the technical capacities of VR360° technology enabled the mentors to perceive, both mentally and physically, what could be termed as the “atmosphere” within the virtual space, thereby broadening their observational perspective and enhancing their understanding of the unfolding scenario. Prior research suggests that the illusion of what is “real” can enhance the VR360° user’s engagement with what is happening in the virtual environment, and this engagement, in turn, can amplify how the content affects and influences the user (Slater, 2009; Slater & Sanchez-Vives, 2016; Wiebe et al., 2014). Given the educational context of our study, we can assume that the mentors’ observations of these interactions, relationships, and their effects influence their professional mentor practice. Previous research has demonstrated that the use of 2D videos as an observational tool can significantly impact the professional growth of practitioners such as mentors, teachers, and pre-service teachers when it comes to discovering, changing, and further developing their own pedagogical practices (Bjørndal, 2012; Magnusson et al., 2023; Tripp & Rich, 2012b). Video, in this sense, provides a pedagogical added value because by offering mentors an increased number of opportunities to observe themselves and a situation from different perspectives (Fransson & Holmberg, 2022).

Bjørndal (2012) emphasized the importance of mentors observing different perspectives and “meeting themselves” through video recordings as part of their university-based mentor education. While meeting oneself in real life is physically impossible, VR technology offers a means to create a bodily and mental experience and sense of actually meeting oneself (Slater & Sanchez-Vives, 2016). Previous research has linked the immersive capacity of VR technology, that allows the user to experience situations from another’s perspective through embodied experiences, to the development of empathic abilities and dispositions (Barbot & Kaufman, 2020; Han et al., 2022; Stavroulia & Lanitis, 2023; Young et al., 2022). In our study, there was no indication that the participating mentors perceived that they were “meeting themselves” from another’s perspective; instead, they reported the feeling of being present “with themselves” and the mentee. The immersive experience of being present in their own supervision appears to enhance mentors’ ability to observe and understand important interpersonal factors, such as the dynamics of the interaction, the relationships between mentor and mentee, and the overall impact of the mentor situation. A growing body of research has highlighted the potential of immersive VR experiences to evoke empathic responses, even in real-life situations (Han et al., 2022; Herrera et al., 2018; Lucifora et al., 2023). This suggests that observing interpersonal dynamics in VR, particularly with setups that enable mentors to embody their mentees, may led to changes in mentors’ professional practices. Thus, this technology can serve as a valuable tool in educational contexts to

support mentors in developing critical mentor competencies such as empathy and the capacity to adopt a mentees perspective, as emphasized by Spencer et al. (2020).

Study limitations

The data collected in this study are limited, which is not uncommon when using VR technology (Mottelson et al., 2021). This limitation arises from the time-consuming nature of conducting such studies, as the participants can currently only engage with the technology individually. Furthermore, unfamiliarity with using such technology can lead to skepticism among potential participants, further contributing to the time-consuming aspect. Additionally, the data in this study relied on participants who were willing to try the technology and share their experiences. Therefore, caution should be exercised when drawing conclusions, and the results should be interpreted by considering the specific context. All participants were enrolled in a university-based mentor education program and had prior experiences observing themselves from an outsider's perspective in a 2D format. They were all motivated to participate because they wanted to explore VR360° technology as part of their work to further develop their own mentor competence.

Summary and implications

Despite these limitations, this study provides valuable new insights that can be relevant to enhancing mentors' professional practices. The virtual environments facilitated by VR360° technology enable mentors to be present in their own mentoring, and the results indicate that the technology has the potential to broaden mentors' observational perspectives, enhancing their ability to observe interpersonal dynamics associated with interaction, relationship, and effects of their words and actions on the mentee in this context. This added pedagogical value of the technology holds promise in fostering mentors' self-awareness and their capacity to change and develop their professional practice. Consequently, the study's findings may have implications for expanding the range of observation tools utilized for mentors' professional development.

There may also be opportunities to use VR360° technology in the context of mentoring groups and observation-based mentoring, as both the mentor and mentee can be present in situations that are otherwise physically inaccessible. Mentors can also broaden the concept of mentoring by guiding their mentees to "revisit" and observe their pedagogical practices from an outsider's perspective. The potential applications are many, and further research with more participants and in other contexts, such as mentoring groups of pre-service teachers in a school or kindergarten practicum, is needed to provide more definitive conclusions about the role of VR360° technology in mentoring education. Such research can help clarify which observation tools are best suited for mentors in their competence development and explore which contexts and approaches are most appropriate for the use of VR technology. Finally, it is also important to explore the practical and didactic considerations associated with implementing this technology.

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