

Social and Emotional Competence Development with 360°-Videos: A Design Experiment

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Abstract: 360°(-degree)-videos represent a promising educational technology to foster social and emotional competencies in vocational education. Social interactions can be experienced and interpreted from different perspectives in an immersive 360°-video environment. However, effective learning designs or didactical interventions are necessary to realize the full potential of this multi-perspective video technology. Against this background, the paper at hand describes a theory-based design experiment to foster social competencies in vocational education using 360°-video technology. The experiment was conducted with pre-service teachers at the University of St.Gallen. Preliminary findings show that the learning design based on an integrative pedagogy seems promising to use 360°-videos about conflict scenarios in vocational education in a didactically valuable way. Although the results were encouraging, further teaching designs with 360°-videos need to be developed and controlled in longitudinal studies, to adequately measure long-term social competence development.

1 Introduction

Empathic engagement, feedback and collaboration have been identified as highly relevant competencies in scenarios where people work together productively (Ferrández-Berruero et al., 2014, p. 3; Pirker & Dengel, 2021, p. 6). These findings seem to be transferable to school ecosystems. Teacher's personal social and emotional competencies and well-being have a notable impact on their students. According to Schonert-Reichl (2017, p. 137), classrooms characterized by healthy and warm teacher-student relationships "support deep learning and positive social and emotional development among students". From a student perspective, it is important to be emotionally and socially competent. As a consequence, promoting and actively teaching social and emotional competencies in vocational education and training by the corresponding teachers is highly relevant (Schonert-Reichl, 2017, p. 149).

However, according to studies from Weissblueth and Nissim (2018, p. 1552), VR potentially enhances the development of social and emotional competencies of trainees` (pre-service teachers). Furthermore, VR (Virtual Reality technology) has been shown to act as an emotional amplifier, intensifying a wide range of positive or negative emotions (Weissblueth & Nissim, 2018, p.1551). This finding opens up interesting horizons in order to enhance student's awareness and understanding of the emotions and actions of themselves and others (self and social awareness). In addition, the development of social and emotional competencies is facilitated by collaborative learning scenarios (Weissblueth & Nissim, 2018, p. 1562). The question arises if that is also true for 360°-videos as a manifestation of VR. Given that 360°-videos offer the user the possibility to perceive a scenario from the point of view of another person, it transforms the experience into a multi-perspective learning opportunity (Stavroulia & Lanitis, 2019, p. 32). The German Research Institute for Vocational Education and Training (F-BB) developed 360°-videos about conflict situations for social competence development. Embedding these videos into a didactic design and testing it represents the point of departure for the present research project.

First of all, the development of a didactic design to embed 360°-videos is of high importance to move from an interesting application to effective and impactful learning (Wohlgenannt et al., 2019, p. 4; Radianti et al., 2020, p. 26). Secondly, Paydon and Ensminger (2021, p. 1) state that the associated social processes (exchange with learning colleagues or coaching by the lecturer) can generate an added value for the learning processes. With reference to the promotion of social competencies in vocational education, the present research contributes to:

1. Testing a didactical intervention (design experiment) by means of Educational Design Research (EDR) to promote social competencies with 360°-videos.
2. Realisation of the design experiment developed by pre-service teachers at the University of St.Gallen in the course *Current topics in didactics* with a simulated class.

To sum up, the following research question shall be answered:

RQ. How can 360°-videos be implemented in a didactical intervention to teach social and emotional competencies in vocational education?

To this end, the paper is structured as follows: Section 2 briefly distinguishes VR from 360°-video technology and provides an overview regarding the underlying theoretical background. Furthermore, a theoretical baseline for the creation of the design experiment will be defined. Section 3 combines all previously introduced elements, describing the conducted design experiment in detail and summarizing reactions to the learning design. Section 4 concludes the paper with an outlook on possible follow-up projects and a reflection on limitations to this research.

2 Theoretical Background

2.1 360°-Video Technology and VR

The distinction of VR and 360°-video technology can lead to confusion as the terms are often used as synonyms. In this light, the heterogeneous definition landscape around the two technologies shall be clarified for this paper. Feurstein (2018, p. 3) defines VR as an "environment in which the participant is fully immersed into a computer simulated reality or a stereoscopic perspective". The main goal of the technology lies in the creation of an authentic sense of presence in a specific place. When it comes to this effect, we speak of so-called *immersion*. Schmoelz (2018) classified different levels of immersive density in the following illustration by distinguishing different compositions of engagement forms, see Figure 1.

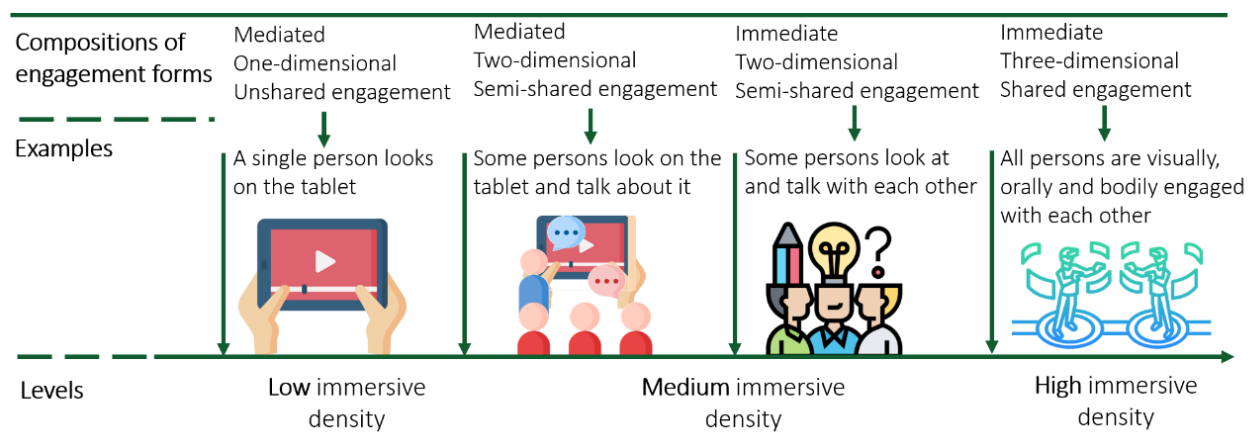


Figure 1: Immersive density. Own illustration based on Schmoelz (2018).

360°-videos make use of vital elements that characterize VR, such as multi-perspectivity and self-directed control. 360°-videos are media which are limited to the possibility of looking around statically in a space or room. They can be uploaded to and accessed via common video-platforms like YouTube. In contrast to fully immersive VR content, they are produced by using real-world footage. In consequence, they do not represent a simulated or animated reality. Immersive experiences can be generated with 360°-videos by using a projection device (e.g., Head Mounted Display [HMD]). Against this backdrop, they can be characterized as a VR application with reference to Milgram et al. (1994) and Zobel et al. (2018).

2.2 Social-Emotional Competence Development

A person's social competence enables a compromise between the demands that the social environment places on the individual and their own interests, which also need to be realised in social contexts. *Social competencies* are hidden and have a considerable effect on behavior in concrete situations (Kanning, 2015, p. 3f.). When it comes to social-emotional competence, *empathy* is an important ability (Stavrouila, 2019, p. 23). Empathy can be defined as "the ability to place oneself in another's position, participate in what one suffers until complete empathetic identification without the loss of the personal identity". Furthermore, 360°-videos seem to be very suitable to enhance empathy competencies of its user (Pirker & Dengel, 2021, p. 9). In this light, Pirker and Dengel (2021, p. 8) state that

"recorded experiences can be useful in the field of empathy learning and to experience the situation from a different personal perspective".

According to Kanning (2015, p. 83), social competencies can be split up in multiple dimensions: 1) *knowledge of roles, norms or values*, 2) *behavioral competencies*, 3) *perceptual and self-regulatory competencies*, and 4) *empathic competencies*. The decisive advantage of 360°-videos in social learning environments lies in the potential to address all of these dimensions. 360°-videos can strengthen the ability to perceive others and take on perspective as the user has the opportunity to observe a scenario from the perspective of another person, turning their experience into a highly involving learning opportunity (Stavrouila, 2019, p. 32). Whereas before it was mainly knowledge about roles, norms or values as well as behavioral competencies that were trained, perceptive and self-regulatory competencies such as empathy, can be well addressed with virtual support.

When it comes to design an effective didactic intervention, the promotion of social competencies can be stimulated by 1) *the development of knowledge (values, norms and roles)*, 2) *Perception and reflection (own behavior, behavior of other people and perspective taking)* and 3) *Behavior (competencies, behavioral strategies and self-direction)* (Kanning, 2015, p. 83). These aspects will be considered for the creation of the didactical intervention in chapter 3.

2.3 Integrative Pedagogy

A first challenge in designing a meaningful experiment was to find a suitable theoretical foundation, which allowed a didactically sensible integration of 360°-videos in a learning design. Heikkinen and Tynjälä developed a promising didactical concept in order to combine theoretical and conceptual knowledge by using mediators (tools and processes), called *integrative pedagogy* (2011, p. 98 ff.; Quincy et al., 2016, p. 21; see Fig.1). It consists of four elements, which are interdependent: 1) *Theoretical*, 2) *Practical*, 3) *Self-regulative* and 4) *Socio-cultural knowledge*. As 360°-videos inherit the potential to foster immersive and social-emotional learning in a collaborative setting it is hypothesized that they have the potential to be suitable mediating tools in an integrative pedagogy (Kanning, 2015, p. 3f.; Luo et al., 2020, p. 11; Weissblueth & Nissim, 2018, p. 1552-1562), see Figure 2.

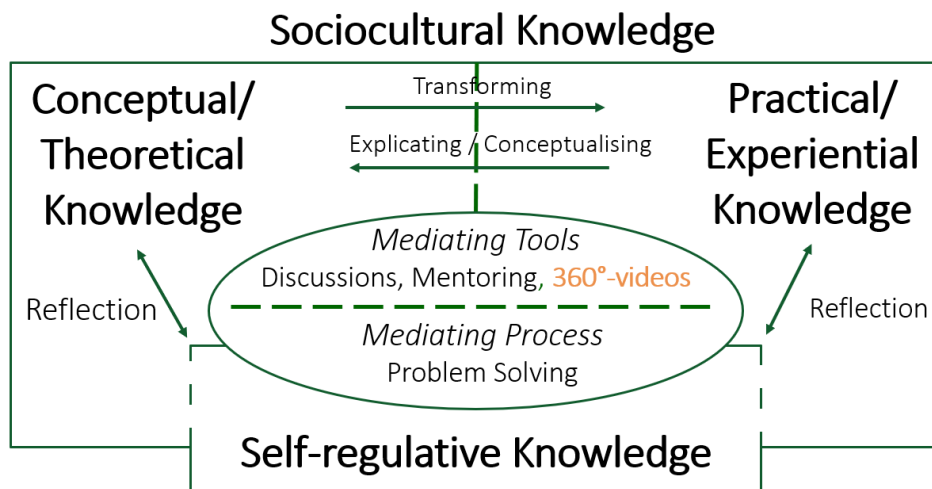


Figure 2: Integrative pedagogy. Own illustration based on Heikkinen & Tynjälä, 2011, p. 99.

According to the model of an integrative pedagogy, it is important for the design to take into account that both a *practical experiential space* and a *conceptual knowledge transfer* take place when it comes to developing social competencies with the help of 360°-videos. The *self-regulating knowledge* includes the reflection of one's own behavior or decisions on a meta-level with the help of a reflexive dialogue. 360°-videos can be useful to mediate between theory, experience and self-regulation in a problem-based learning scenario (Heikkinen & Tynjälä, 2011, p. 98; Kanning, 2015, p. 83). To sum up briefly, the model fulfilled our ideas of integrating 360°-videos into a process of practical work combined with reflection and abstract conceptualization of principles addressing constructive conflict behavior.

In order to promote social and emotional competencies by introducing a concrete learning scenario, *situated learning* i.e., socially collaborative knowledge construction could be a promising way to go (Gaudin & Chaliès, 2015, p. 58; Greeno, Collins & Resnick, 1996, p. 40). A situated learning approach is based on the assumption that learning

should happen by applying elements such as stories, reflection, collaboration, coaching and practical experiences (McLellan, 1996, p. 48; Greeno, Collins, & Resnick, 1996, p. 40). A connecting factor between an integrative pedagogy and the situated learning approach lies in the focus on learning in communities of practice. 360°-videos offer the possibility to create immersive learning scenarios (if used with HMD), which can be extended with collaborative learning aspects such as discussion, mentoring or coaching. For the instructional design to be created, interactive 360°-videos of conflict situations are acted out, analysed and discussed in order to meet the demands of an integrative pedagogy. The *socio-cultural knowledge* in the university context where the teaching design is planned and conducted, can be characterised above all by active collaboration as well as critical discussion in the didactical intervention (described in chapter 3). The mentioned theoretical points of orientation will be considered for the design of the didactical intervention, which is described in the next chapter.

3 Design Experiment at the University of St.Gallen - Social Competence Development in Vocational Education

3.1 Context and Design Process

The three students who planned the design experiment in the course *Current didactical topics* during the spring semester 2021 at the University of St.Gallen are pre-service teachers (Master students in the business education programme). 50% of the participating students were female, aged 21-33 with a mean age of 25.1. The overarching goal of the course was to *design and test innovative didactical interventions by applying modern technology*. The structure of the course is based on the *Educational Design Research* (EDR) approach of McKenney and Reeves (2013), see Figure 3.

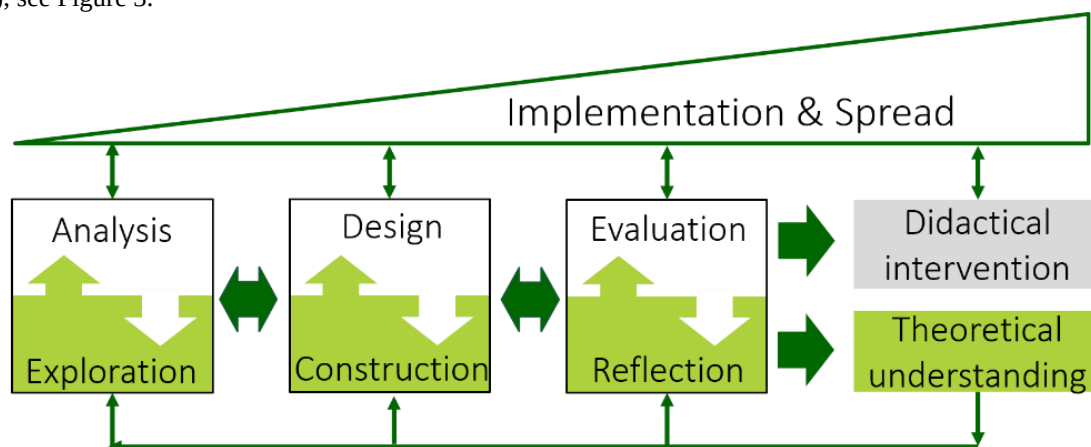


Figure 3: Educational Design Research. Own illustration based on McKenney & Reeves, 2013, p. 14.

EDR is a research paradigm focussing on the iterative development of solutions to practical and complex educational problems leading to solutions like educational designs, processes or other products (McKenney & Reeves, 2013, p. 1). The students worked through the EDR-process in order to create their didactical intervention (design experiment). They were accompanied and coached during the preparation and implementation process. The participants (simulated class) were asked to evaluate the quality of the didactical intervention in an oral debriefing session after the intervention. The students developed a concept (design plan) in order to address the research question mentioned in the introduction. In doing so, the following aspects had to be considered for the didactical intervention:

- Inclusion of relevant reference theories and their application (theoretical foundation)
- Design of innovative and pedagogically valuable interventions (duration of 45 minutes)
- Support for critical reflection and self-reflection (experiential learning)

The three students designed and conducted a didactical intervention with existing 360°-videos on how to deal with conflict situations in vocational training (F-BB, n.d.) ([VIDEO](#)). The design experiment took place in a simulated classroom setting, which was chosen for two reasons: Firstly, classroom simulations offer the possibility for pre-service teachers to develop their competencies in a "controlled and perceived safer environment than a 'real'

classroom" (McGarr, 2020, p. 161). As a result, it allowed us to experiment with 360°-videos in a protected environment. Secondly, the students should be able to provide critical feedback on the lesson design from the perspective of the class as well as from that of didactic experts. Through this high-quality feedback, the learning process of the teaching students was promoted.

3.2 Description of the Design Experiment

In this chapter, the developed design experiment is described in detail. The design experiment was split up in three main phases: briefing, the design experiment itself and a debriefing, see Figure 4.

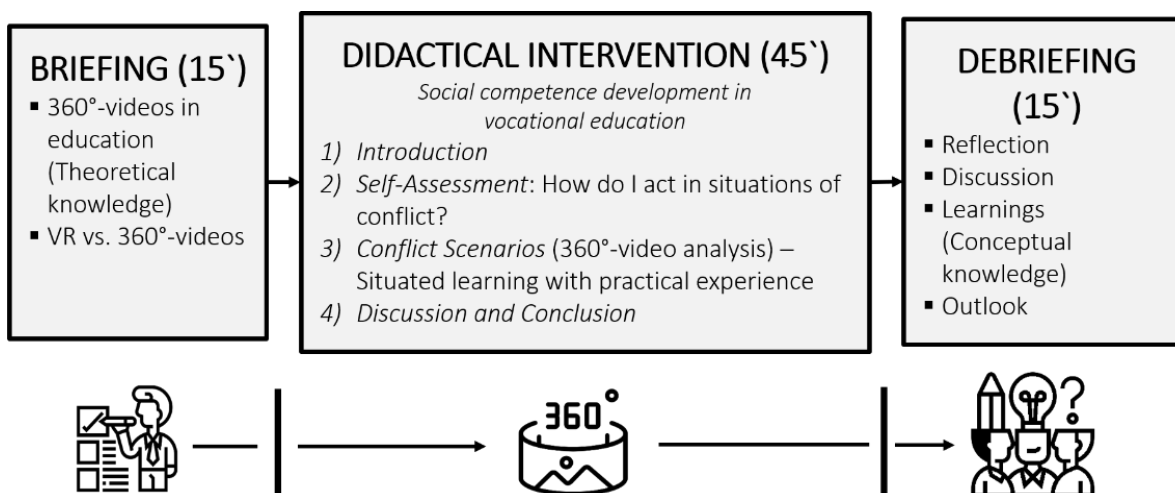


Figure 4: Design experiment. Own illustration.

However, in order to address the research question, it was important to consider certain design aspects in order to effectively teach with 360°-videos. Those aspects are described in more detail within the sub-chapters 3.2.1 – 3.2.3. To assure a "learning goal-oriented" teaching, the design is intended to meet the requirements of an integrative pedagogy by subjecting the concrete experiences of dealing with conflict situations in the 360°-videos. However, it must be stated that the core of the design experiment is the didactical intervention itself, whereas the briefing phase provides a bigger and clearer picture for the students about 360°-videos in education as some of them have never worked with this medium. The debriefing phase shall lead to takeaways for the teaching students in order to qualitatively develop the didactical intervention. From a technological point of view, the didactical intervention was conducted in a synchronous online-setting via ZOOM due to restrictive measures based on the current COVID-19 crisis which lead to limitations in the perception of immersive effects of the 360°-video. Nevertheless, the advantages of the 360°-videos for the development of social competencies like the perception of the situation from an ego-perspective resulting in a better empathetic feeling for the participants, can also be partially experienced in a computer-based setting without the use of HMDs. In addition, it represents a more cost-saving approach when it comes to learning with 360°-videos compared to buying multiple HMDs like the *Oculus Quest* which still requires a notable investment. In the following sub-chapters, the three phases characterizing the design experiment will be described in further detail.

3.2.1 BRIEFING

During the briefing phase, the teaching student group described the differences between VR and 360°-videos and showed a variety of use cases, where 360°-videos have been used in education (e.g., at medical schools). As our experimental design is located in the course *Current topics in didactics* of the teacher education programme, we asked the students to inform their colleagues about the technology and its potentials prior to the didactical intervention. As they are pre-service teachers, it is relevant for them to learn more about how 360°-videos can be used in teaching in order to expand their knowledge of media didactics. Secondly, the group introduced the 360°-videos of the conflict scenario developed by the *F-BB (German, Research Institute for Vocational Education and Training)*, which represented the learning materials for the upcoming didactical intervention. It shows different conflict situations with

three parties involved (trainer, co-trainer and trainee). The user has different possibilities within the videos to steer his or her actions (blue buttons in the 360°-videos; see Figure 7) ...

...as a *trainer* (clarify points of view, clarify conditions, convey error culture)

...as a *trainee* (deflect blame, inquire about conditions, search for errors)

...as a *co-trainer* (assign blame, explain conditions, look for mistakes).

It would have been too much effort for the students to produce and programme interactive 360°-videos by themselves. Accordingly, existing video material from vocational education and training (F-BB, n.d.) on the topic of "social skill development" was used for our course. We decided to use those videos, because 1) they are developed by a well-known organization with deep knowledge in pedagogy, 2) they are accessible as open source materials and 3) they show interesting scenarios which allow to work on personal social competencies in an adequate amount of time (10-15 minutes per video sequence). The 360°-videos by the F-BB simulate a typical situation of conflict between two trainees and their trainer, see Figure 5.



Figure 5: 360°-Conflict Scenario "Dealing with errors in industry". Own illustration based on images from F-BB (n.d.).

The user (student) can take on the role of either the trainee or the trainer. At certain points in the video sequence, the user can choose between various standardised reactions to a specific situation. The chosen action results in a counter reaction of the other person involved. The aim is to illustrate behavioral patterns that enable conflict resolution. However, the consequences of behavioral patterns that leave conflicts unspoken or even lead to escalation are also made tangible. The mutual assumption of perspectives during the change of roles promotes the understanding of the conflict partners for each other.

3.2.2 DIDACTICAL INTERVENTION

Overall, the didactical intervention is 45 minutes in length for the context of vocational education. First of all, the simulated class was asked which **typical situations of conflict** they knew from their everyday life via mentimeter (menti.com). The participants answered with examples such as unclear expectations, planning of vacations, annoying customers, bad communication flows, unclear responsibilities in a project etc., see Figure 6.

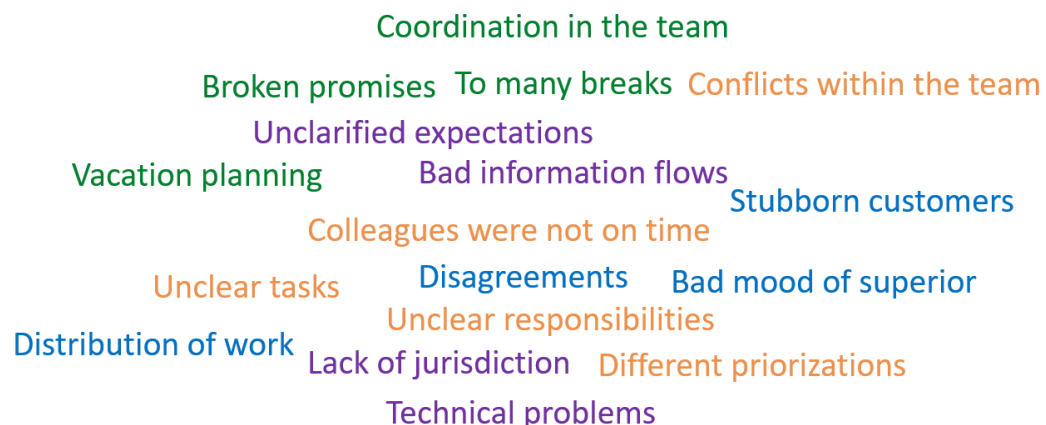


Figure 6: What typical conflict situations do students know from their everyday working life? (mentimeter wordcloud). Own illustration based on images from mentimeter.com.

According to Radianti et al. (2020, p. 3), activating prior knowledge is important for an effective use of 360°-video in the classroom. For this reason, a brainstorming on the topic of "conflicts in the workplace" was carried out

with the help of the mentimeter wordcloud depicted in Figure 6. This introductory question was followed up by a **self-assessment** on conflict behavior in critical situations to find out how an involved person deals with conflicts in different situations. The self-assessment referred to the behavior at work instead of the private life. The students had to judge statements according to whether they could have been made by them (e.g., I put off discussion and problem-solving processes). This resulted in a classification of their conflict type, based on the Thomas-model from "*Thomas-Kilmann Conflict Mode Instrument - TKI*" (2002). The model differentiates five types of conflict: 1) *the cooperative*, 2) *the assertive*, 3) *the compromiser*, 4) *the avoider* and 5) *the yielder*. From a didactical point of view, this self-assessment raised their awareness for their personal "conflict profile". Being aware of the personal profile of conflict, the work with the 360°-videos gains an increased quality, as a clear point of reference for assessing the conflict situations and their causes has been created.

Before the students actively worked with the 360°-video, they have been shown a learning video about "rules for constructive conflict behavior" (F-BB, n.d.) ([VIDEO](#)). According to the video, six key rules are crucial in order to constructively address situations of conflict:

1. *Refrain from violence*: even if an argument threatens to escalate, you should never get physical.
2. *Change of perspective*: try to put yourself in the other person's position.
3. *Willingness to talk*: each party should engage in a joint discussion in order to find a solution.
4. *Ability to engage in dialogue*: let the other person speak out and respond to them. This increases the willingness to seek a shared solution.
5. *Mediation*: if a conversation cannot be initiated by the involved parties due to an escalated situation of conflict, a third person can help to mediate.
6. *Trust*: working through conflicts needs trust. One's own actions should be communicated to the other person.

From a didactical point of view, this learning step bridged between the activation of the student's prior knowledge and the 360°-video scenario. By being sensitized for rules of constructive conflict behavior, a reflection process is initiated which confronts personal conflict solving strategies with "good practices". This sensibilization leads to a better perception of destructive conflict behavior in the video sequences and thus serves a holistic development of social competencies. After watching the learning video carefully, the students started to individually work with the 360°-videos. The students were asked to interpret the situations and finally choosing a reaction to the conflict from the point of view of the three parties. Based on the chosen reaction, the video continues to run and the students experience what consequences result from their actions, see Figure 7.



Figure 7: Actions in the 360°-video learning environment. Own illustration based on images from F-BB (n.d.).

This procedure enables structured, self-directed and ultimately situated video learning, which should ultimately sharpen the social competencies of the individual student (Kanning, 2015, p. 3f.; Feurstein, 2018, p. 2; Snelson & Hsu, 2020, p. 1). During the video analysis, the students had to pay attention whether rules for constructive conflict behavior were applied in a concrete situation. Hereby, theoretical knowledge is linked to concrete action in the logic of an integrative pedagogy. Furthermore, they were given four questions which lead them through their learning process. They had to write down their findings in a pre-structured padlet (padlet.com):

1. Which behavior of the trainee has a positive influence on the resolution of the conflict situation?
2. Which behavior of the trainee has a negative influence on the resolution of the conflict situation?
3. Which behavior of the co-trainer has a positive influence on the resolution of the conflict situation?
4. Which behavior of the co-trainer has a negative influence on the resolution of the conflict situation?

This learning step sets the base for a lively and insightful discussion after the work with the videos. Furthermore, it is important to actively process and safe learnings from the video study in written form (Reusser &

Pauli, 2015, p. 913). The lesson was concluded with the discussion of the following questions, linking the initial self-assessment with the work in the 360°-video environment. In this sense, a collaborative knowledge construction is ensured:

1. Have you identified behaviors in the video that would match your conflict type?
2. Why is a constructive culture of error so relevant?
3. What possible solutions do you take away from this lesson for your own conflict behavior?

Finally, the reactions from the students involved regarding the described design experiment with the 360°-video were very positive. They felt that the didactical intervention was insightful due to the practical hands-on experience with the 360°-video material. This made it easier to empathetically feel and understand the situation of conflict between trainer and trainee. Of course, the long-term development and verification of social competencies should be completed through further experimental approaches including concrete competence-development measurements. In the context of the course, however, the main focus lied on designing an effective learning scenario which could be conducted from distance via synchronous online teaching.

3.2.3 DEBRIEFING

In the 15-minute debriefing session, the experiences from the design experiment were summarised in an open group discussion. We assessed the design experiment by discussing positive and negative aspects with the student group forming the simulated class (data collection). The students stated that compared to a classical single-perspective video a change of perspective in the 360°-environment leads to a better understanding of situations where human interaction takes place. The students also felt more affected by the situation and could empathize with it. This effect was favoured by the multi-perspectivity and the choice of options for action. The collaborative reflection process in the debriefing session strengthened and sharpened the take-aways for personal behavior in conflict situations. On the negative side, the simulated class felt that the navigation within the 360°-videos by using a web-browser was quite difficult. This effect could probably be reduced by using an HMD, which was not possible though due to the current COVID-19 situation.

4 Conclusion and Discussion

In conclusion, the paper at hand tried to elaborate how social competencies can be taught by using 360°-videos embedded in an effective didactical design. Literature showed that learning with 360°-videos is effective when combined with collaborative learning steps, reflection processes and abstract conceptualization of concrete situations experienced in the video.

Before concluding on this research, it is important to highlight relevant limitations. First of all, the design experiment was conducted via ZOOM, which means that 1) Immersive effects of the 360°-videos could not be tested, as they were used remotely from home via computer due to COVID-19 restrictions and 2) intrapersonal effects were highly difficult to observe and in consequence to measure. The design experiment was conducted with pre-selected 360°-video material which was produced externally. To conclude on the limitations, we worked through the design experiment with students from the University of St.Gallen. This allowed us to experiment in a protected setting and to gain first experience with their developed experimental design.

It was mentioned by the involved students, that working with 360°-videos using HMDs would trigger a greater group effect. This means that in a classroom setting the motivation to work together with the VR glasses would be higher compared with an online format and correspondingly associated with more enthusiasm. At this point, we can only speculate about specific effects of the use of HMDs, but it is an interesting feedback from the students and hopefully the mentioned scenario can be realised as soon as the COVID-19 situation is a memory.

Nevertheless, first impressions and outcomes of the design experiment are promising. Referring to the research question it seems that the used 360°-videos inherit the potential to increase empathy as well as the focus in reflection processes in order to develop social competencies of students in vocational education. Embedding the video material in a meaningful didactical design by working collaboratively seemed to be an important factor to enable a constructive learning process. Furthermore, the developed design experiment by means of an integrative pedagogy and situated learning seems to be suitable to raise awareness for adequate behavior in social conflicts, as reported by the participating students. Future research should rely on longitudinal study approaches in order to test whether social

competencies can be effectively developed using 360°-videos in vocational training as it may not be possible to measure competence developments after a single didactical intervention.

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