Moral Conflicts in VR: Addressing Grade Disputes with a Virtual Trainer

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Abstract. A Virtual Trainer (VT) for moral expertise development can potentially contribute to organizational and personal moral well-being. In a pilot study a prototype of the VT confronted university employees with a complaint from an anonymous student on unfair grading: a plausible scenario. Addressing criticisms from students may be a stressful situation for many teaching professionals. For successful training, adapting the agent's strategy based on the performance of the user is crucial. To this end, we further recorded a multimodal dataset of the interactions between the participants and the VT for future analysis. Participants saw the value in a VT that lets them practice such encounters. What is more, many participants felt truly taken aback when our VT announced that a student was unhappy with them. We further describe a first look at the multimodal dataset.

Keywords: VR, skill training, moral expertise, moral conflict, gaze, multimodal

1 Introduction

An experienced teacher knows how to solve moral conflicts, and can do so with little mental effort and a good conscience. Those with less experience might experience uncertainty when facing such conflicts, which causes moral stress [10]. In the workplace, moral stress has been shown to increase fatigue, lower job satisfaction, and lead to higher turnover [4]. In the following we present the idea of a virtual trainer (VT) for practicing moral conflicts to improve moral competences. In particular, we investigate this in the context of teachers and supervisors in an academia.

A first evaluation of the concept was in the form of a pilot study using a Wizard-of-Oz prototype. Qualitatively, we investigated how participants perceived the training throughout several stages, and to what extent they could see themselves using such a system at work. A second research question is in what ways we can automatically determine the user's performance during such a training. How people react to the possibility that others view their actions as morally questionable may elicit emotional and stress responses, the extent of which may be used as one dimension of their *performance*. While the reasoning process alone is often prioritized in moral decision-making research, affective features that accompany moral reasoning are equally important and mostly under-represented [7]. To this end, the interaction with the VT during the pilot study also serves as a multimodal data-collection for future analysis, including gaze, physiological signals and verbal and non-verbal aspects of speech.

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2 Ethical Competences Training

Acquiring ethical expertise for work requires convergent and divergent experiences [3]. Convergent experiences depend on topically similar moral situations, such as a repeated experience of assessing students fairly. Divergent experiences are based on different ethical scenarios, such as in individual coaching, classroom conflict resolution or multicultural education. However, necessary experiences to build one's moral expertise are often limited, especially for those who are in early stages of their careers. A common conflict for university teaching staff is on grading students fairly. Quality feedback is important for progress and it is a prerequisite for academic assessment of students [1]. University tutors tend to believe that their feedback is more helpful than students who receive them [1], leading to grading conflicts [8].

A moral conflict is experienced when there are simultaneously competing obligations or principles that cannot all be fulfilled [9]. Moral stress occurs when decision makers face uncertainty on actions to take on ethical matters [10]. Workplace moral stress has been shown to increase fatigue, lower job satisfaction, and lead to higher turnover [4].

3 The Virtual Trainer Prototype

A prototype of the VT was developed that could be controlled in a Wizard-of-Oz setup (WoZ, [2]). With the prototype, users were lead through a natural conversation of three parts, as shown in Table 1. After some small talk on personal and work related matters, the goal was to expose users to relatable moral conflicts pertinent to their work as teachers or supervisors. Extra utterances were included to help elicit more elaborated responses (*How do you feel about that?*). The VT speaks with a TTS module and head-tilt and gaze behavior was implemented as described in [5] for the *accommodating* agent personality. Besides blinking, the agent would exhibit no other nonverbal behaviors.

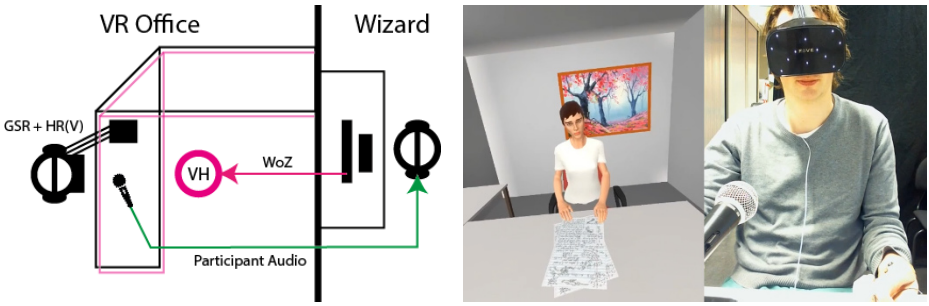

Fig. 1. The experiment setup (left). The participant is immersed in a virtual office that matches the real room, with the VT located across the desk (shown right).

Table 1. Some of the Agent's utterances in the WoZ setup per part of the conversation.

Part	Utterances
Small talk	What are you currently working on?; Could you describe a typical work day?
Teaching	Have you given lectures?; Can you tell me more about a recent student project?; How do you feel about being in a teaching position?
Conflict	According to the student you did not give timely feedback.; Have you had such complaints from students before?

4 Pilot Study & Data Collection

In the pilot study, participants engaged in a brief (8-10 minutes) interaction with our prototype. Exit interviews were conducted on how the VT was perceived throughout interaction. During the interaction, the topic of the conversation changed as a within subject variable from 'small-talk' to 'teaching' to 'grading', as described in Section 3. With several sensors, we recorded participants activity: Voice and video using a web-cam and studio microphone; Participants eye-gaze in the virtual world using the *FOVE* HMD; Heart rate and electrodermal activity using the *BioSemi ActiveTwo* system.

In total we recruited *42* participants (Age *M=31.19 SD=8.52*), of which twelve were female. All but one finished the entire experiment, questionnaire (not discussed in this work) and interview and were included in the qualitative analysis. In the resulting dataset, recordings of *32* participants (seven female) were completely successful in all modalities.

Exit Interviews Preparing for job-related morally stressful situations with a VT was seen as helpful. VTs were not seen to have the privilege of attributing blame on humans, while facilitating human communication and ethical expertise training was allowed. VTs that conversationally frame ethical dimensions of what is unacceptable or acceptable behavior was unfamiliar and thus confusing for many. In contrast, VTs that introduce moral situations as uninvolved third-parties were more likely to be accepted. When our VT pointed out that a student viewed a participant as unprofessional or unfair, participants shared that the experience became 'more realistic' or 'immersive', with the VT being 'critical' and trying to give 'blame', and many had to think back on their experiences with former students. This signified that both cognitive and moral aspects were essential to participants' thought processes.

Gaze Analysis We performed a first analysis on the eye-tracking data. Based on our previous work [6], our hypothesis was that participants' gaze behavior would be increasingly avoidant between the non-conflict and conflict parts of the dialog, due the personal, accusative nature of the scenario. We tested this with two measures: First, the proportions of time spent by participants fixated on agent's face (rather than averting gaze), and second, the duration of participants' fixations on the VT's face before averting their gaze. We expected the turn of speech to primarily determine gaze behavior, thus, we looked at the gaze data within participants and VT turns respectively.

Indeed, we found that when the VT was talking, participants mostly looked directly at the agent (*M=.93*, *SD=.10*), whereas during their own turn, participants also spent some proportion of the time averting their gaze, (*M=.67*, *SD=.21*). When the VT was talking, participants also had longer continuous fixations on the agent's face (*M=4.33s*,

SD=2.40s). During their own turn, fixations on the VT were shorter (*M=1.86s*, *SD=1.14s*). Comparing the means between the three topics of conversation of the conversation however, we find little difference. A repeated measures ANOVA with a Greenhouse-Geisser correction confirmed this for both the proportion and duration measure.

5 Discussion & Conclusion

We introduced the concept of a virtual trainer for helping university teachers to develop and hone moral expertise. A qualitative evaluation based on exit interviews was made and a multimodal dataset of the interactions was recorded for future analysis. We further took a first look at the eye-tracking data.

The overall findings from the qualitative exit interviews suggest that future research on VTs as morally equal counterparts may be enlightening. In the interaction participants were engaged, albeit surprised. User-acceptance of technology has mostly envisioned friendly, cooperative agents, yet ethical competence development may involve stressful or conflicting situations in which users do not always have the upper hand.

We expected increased frequency of gaze aversion and overall less eye-contact with the agent when addressing the conflict. The preliminary analysis did not reveal any significant differences between the non-conflict and conflict related parts of the conversation. Future analysis of the dataset incorporating other modalities may lead to a better understanding to what extent the recorded cues may be used to determine performance of users of such a system.

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