A glimpse of future – exploring objective measures for evaluating medical teamwork in VR settings – an interview review

Wespi R[1], Kämmer JE[1], Birrenbach T[1], Manser T[2], Schauber SK[3], Sauter TC[1],

[1] Department of Emergency Medicine, Inselspital, University Hospital, University of Bern, Bern, Switzerland; [2] FHNW School of Applied Psychology, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;
[3] Center of Health Science Education - University of Oslo, Norway

Project Aim

- Simulation training is currently the gold standard for team training in various medical fields (Weaver et al., 2014).
- In order to make team training more flexible in its application and planning, work has been done in recent years to implement it in virtual reality (VR).
- In this context, it would be reasonable if the assessment of team performance could be objectified with the help of a VR system.
- However, there is currently no adequate way of objectively evaluating team performance, for which we would like to lay the foundation with this work.
- The intention is not to replace the established systems with objective assessments of team performance, but merely to complement them.

Methods

Procedure:

- **Data collection:** semistructured interviews were conducted and recorded in German or English via videosoftware and consisted of a pre-briefing, a main part and a debriefing.
- **Transcription:** The transcription was carried out semi-automatically with the help of a software (Dragon NaturallySpeaking, Nuance Communications Inc.).
- **Coding and Analysis:** The interviews were iteratively coded and analysed according to the approach of Kuckartz (2019), and categories were derived.

Sample:

- **Experts:** To date, 27 interviews have been conducted with team experts from two different groups - medical and research experts (37% women, mean age: 48.3 years, SD: 8.9).
- **Medical:** 18 interviews with medical experts working as simulation trainers in Switzerland, Germany and Austria were analysed (27.8% women, mean age: 48.1 years, SD: 8.6).
- **Research:** 9 Interviews with team research experts from Europe and the US were analysed (55.6% women, mean age: 48.9 years, SD: 10.1).

References

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Preliminary Results

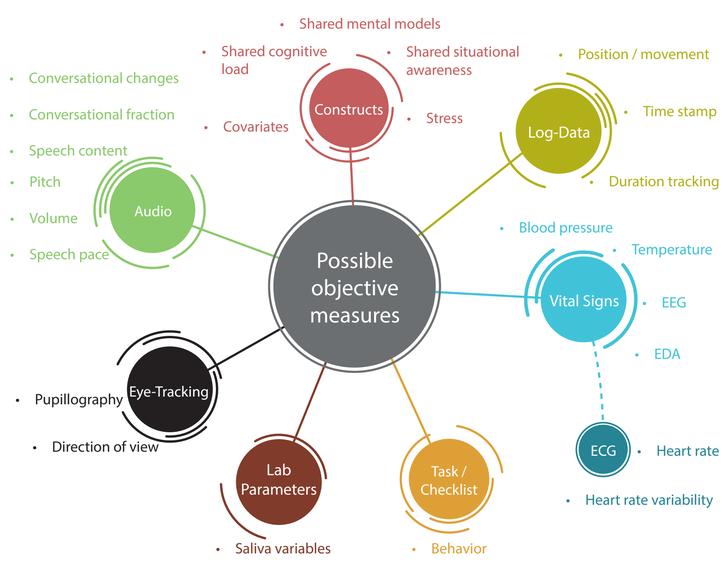

Figure 1: Illustration of collected answers to the question of which objective measures can be used to measure team performance according to

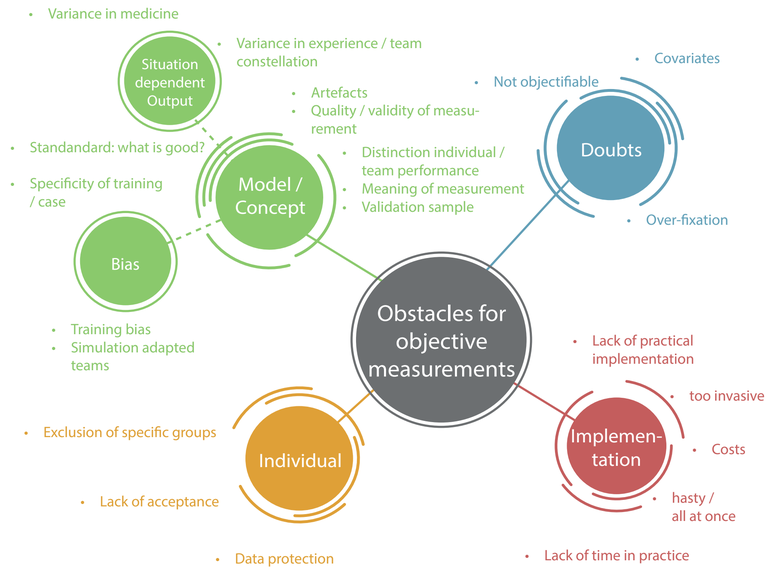

Figure 2: Presentation of the collected answers to the question of what problems / obstacles could arise in the measurement of team

- In the interviews, a wide variety of constructs and measurement methods were mentioned that could be used for an objective assessment of team performance (Figure 1).
- These include classic physiological parameters and lab parameters, as well as methods such as audio analysis of team communication or eye tracking.
- Stress was the main construct mentioned, as well as shared processes such as shared mental model or shared cognitive load.
- A variety of potential obstacles were reported, most of which revolved around the issues of implementation, usefulness, trainee participation and the underlying concept (Figure 2).
- Besides the doubt that team performance cannot be measured objectively, the main concern of the experts was that the use of biological data could be too intrusive into the privacy of the trainees and that they could suffer negative consequences from the measurement of biological parameters.

Discussion

According to the experts interviewed, it should be possible to measure team performance with objective markers, even though such an approach is complex, requires a lot of research and might meet resistance from trainers and trainees. Supporting evidence comes from research on assessment measures in the literature. For example, research on physiological synchronicity shows that groups that have more synchronous biological measures such as heart rates or electrodermal activity also show better team performance than groups that have less synchronous data (Mayo et al., 2021). Nevertheless, the doubts of the interviewed experts are not negligible, which is why it is necessary to set up appropriate data protection guidelines, conduct further research on the feasibility and implementation of objective measures, and cooperate with instructors and trainees of simulation training in order to be able to guarantee in the long run that individuals will not suffer negative consequences.

Future Direction

We are currently facing various challenges. One of the main points will be the theoretical conception as well as the technical implementation and application in practice. At the fashion level, one of the biggest hurdles is the validation and creation of a meaningful standard for team performance, as there is currently no established gold standard for team performance, which could be due to the fact that team performance is a complex construct and medical situations are extremely diverse and unstandardised. To address these challenges, we will address these issues over the coming months and years.

Conclusion

According to the experts interviewed, it should be possible to measure team performance with objective markers, although such an approach is complex, requires a lot of research and might meet resistance from trainers and trainees. In addition, it is necessary to establish appropriate privacy guidelines, conduct more research with regard to team performance standards and to work together with trainers and trainees of simulation training.

Contact:
Rafael Wespi
MSc. Psychology
PhD-Candidate
Inselspital Bern
rafael.wespi@extern.insel.ch
www.visl.ch

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