

# IMPACT OF VISUALIZING TEAMMATES' ACTIONS ON THE SHARED SITUATIONAL AWARENESS IN VIRTUAL REALITY

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## 1. Introduction & Aim

**Goal:** what is the impact of visualizing teammates' actions in Virtual Reality (VR) on their Shared Situational Awareness (SSA)?

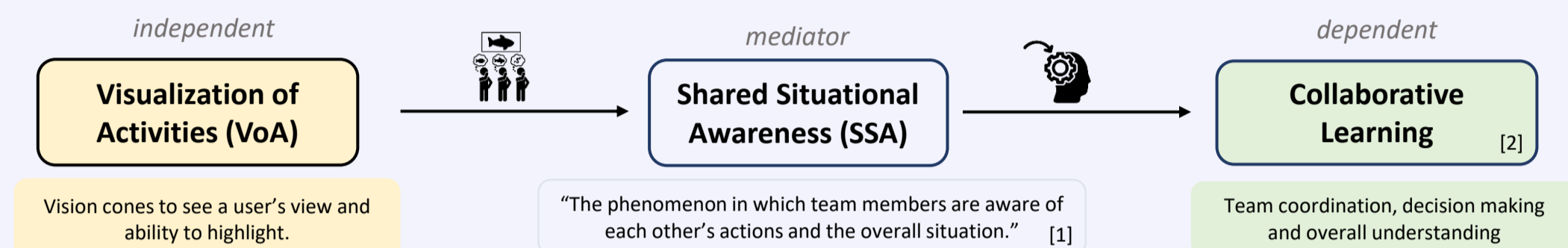


Figure 1: Schema explaining the variables of this experiment and their correlation.

Other **external factors** that could influence the experiment [3]:



## 2. Methodology

Puzzles



Figure 3: Example of color puzzle inside of the maze, where each participant can only see one color.

Data Collection

1. Audio Recordings - dialogues
2. Screen Recordings - points of view
3. Task Performance - 30 min progress
4. Questionnaires - experience & SART

Data Analysis

- **SART** (Situation Awareness Rating Technique): subjective analysis through questionnaire. [4]
- **SALIENT** (Situation Awareness Linked Indicators Adapted to Novel Tasks): objective analysis of dialogues. [5]

## 3. Results

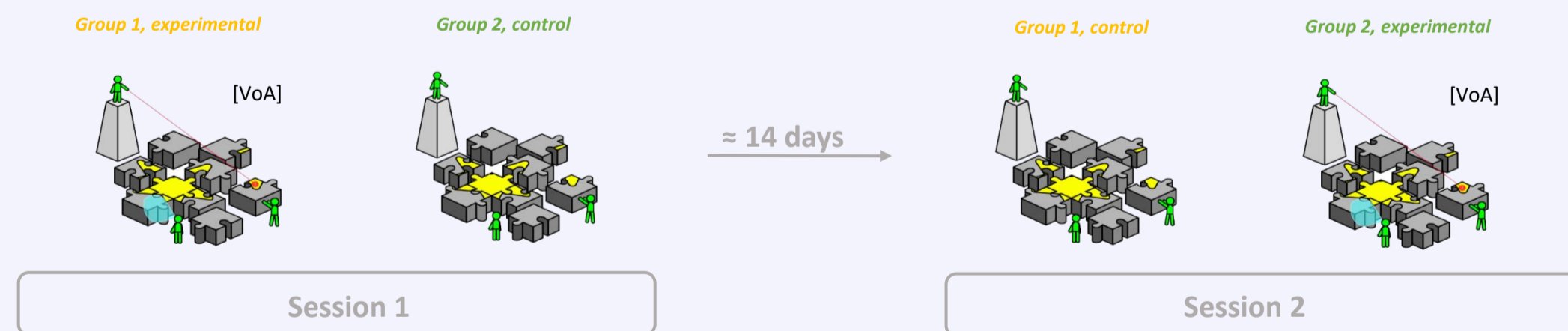
**SART:** session two resulted in higher SSA.  
**SALIENT:** session one resulted in higher SSA.  
 Independently from condition.

Group	Session	Condition	SART	SALIENT
1	1	Controlled	4	0.083
	2	Experimental	5.3	0.077
2	1	Experimental	1.3	0.232
	2	Controlled	10.3	0.090

Figure 3: Table containing the results from each session of the experiment.

## 2. Methodology

This project was tackled through an **experiment**, repeated twice, with **two groups of three participants**.



Task

30 minutes in a maze where the exit is found by solving color puzzles.  
 Each participant can only see one color: blue, yellow or red.

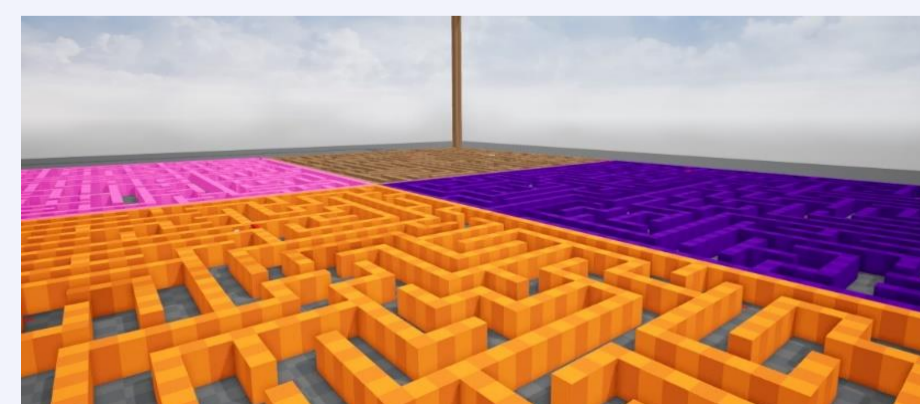


Figure 2: Top view of the VR maze used for the experiment.

## 4. Conclusions & Discussion

The VR experiment did not demonstrate a consistent change in SSA between visualizing teammates' activities and not.

Explanations

- Higher **confidence** on the second session
- Less **description of scenarios** due to familiarity
- **Maze** not prompting participants to communicate.
- Not accurate **inter-reliability** of SALIENT

Conclusions

- This **experiment** was **not suitable**
- Choose **correct SA measurement tool** according to the system under study.
- More **time** in between the sessions

**Terminology:** Virtual Reality is defined as "the use of computer modeling and simulation that enables a person to interact with an artificial three-dimensional (3-D) visual or other sensory environment" [6].

**References:** [1] M. R. Endsley and D. G. Jones. Designing for situation awareness: An approach to user-centered design, second edition. 2016; [2] O. et al. Kulyk. Situational awareness in collaborative work environments. Information Science Reference, 2009; [3] Bolstad C. A. Gonzalez C. Cuevas H. M. Saner, L. D. Measuring and predicting shared situation awareness in teams. Journal of Cognitive Engineering and Decision Making, 3:280–308, 2009; [4] Situation awareness rating technique (sart). <https://ext.eurocontrol.int/ehp/?q=node/1608>. Accessed: 2023-05-03; [5] Situational awareness linked indicators adapted to novel tasks (salient). <https://ext.eurocontrol.int/ehp/?q=node/1606>. Accessed: 2023-05-03; [6] H. E. Lowood. Virtual reality, encyclopedia britannica. <https://www.britannica.com/technology/virtual-reality>, June 2023