Mixed Reality Experience Questionnaire (MREQ) - Reference

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ABSTRACT

The Mixed Reality Experience Questionnaire (MREQ) is designed to be used as a measure of a user's sense of presence and their general experienced perception of an Augmented Reality, Virtual Reality, or Augmented Virtuality environment. It consists of 33 seven-point-Likert-like items. Researchers might want to apply all or only some of those items.

This Technical Report serves as a reference. Researchers who use this MREQ are asked to send their findings and/or publications to the first author and to cite this Technical Report.

Author Keywords

Sense of Presence, Mixed Reality, Augmented Reality, Questionnaire

MIXED REALITY ENVIRONMENT: ELEMENTS

Figure 1 shows the relationships in a typical Mixed Reality environment. Those relationships form the basis for the MREQ.
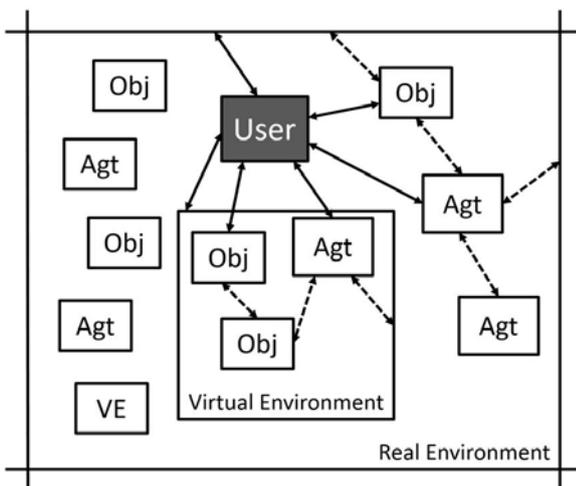

Figure 1. Overview of Relationships between User and MR Elements

QUESTIONNAIRE CONSTRUCTION

The following table presents the list of all items which can be used in measuring the MR experience. We list primary and secondary (alternative) items to be applied in different scenarios and tasks.

All items have "strongly disagree" and "strongly agree" as anchors ranging from 1 to 7. No other qualifying information is given (e.g. no middle anchor text) (Likert-like scale) See figure 2 for an example.
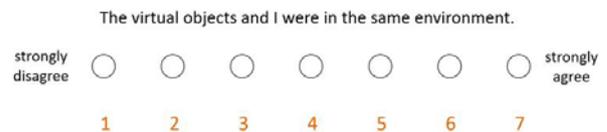
Figure 2. MREQ example item

Items in square brackets in Table 1 can either be used as is or can be replaced by the actual name of the virtual object(s). E.g. "The cups belonged to the virtual environment." Similar for all other texts in square brackets.

All or selected only items can be used (Table 1).

Additional notes:

In collaborative MR environments [agents] would normally refer to other people present in the environment. Those might be real people present in the real environment (co-located) or more or less realistic visualisations (e.g. blue-c voxelized) or embedded video streams (like in cAR/PE! Regenbrecht (2004). [virtually presented agents] refers to avatars in different shapes and forms, like e.g. in SecondLife. Also, [agents] might be manually, automatically or AI-controlled animals or other creatures.

Virtual Environments within the real environment are for instance worlds-in-miniature (e.g. MagicBook worlds). Some users might also consider groups of virtual objects as belonging to one virtual environment (which often, in fact they are).

Some MR environments, e.g. clinical applications, require special, alternative items. This can be existing or modified versions of the MREQ or other questionnaires. Preferably one should try to modify MREQ questions.

Table 1: MREQ questionnaire items

No	Relation	Item(s)
1	P(RE)	There was a real world environment.
2	P(VE)	There was a virtual environment.
3	P(RO)	There were real objects.
4	P(VO)	There were virtual objects.
5	P(RA)	There were other (real) [agents].
6	P(VA)	There were virtual representations of other [agents].
7	P(Usr)	I could recognize myself in the environment.
8	Usr-VE	I felt I was part of the [virtual environment].
9	Usr-RE	I felt I was part of the [real environment].
10	Usr-RO	The [real objects] and I were in the same environment. (I felt I could have touched the [real objects])
11	Usr-VO	The [virtual objects] and I were in the same environment. (I felt I could have touched the [virtual objects])
12	Usr-RA	[Other agents] and I were in the same room.
13	Usr-VA	The [other virtually presented agents] and I were in the same environment.
14	VO-VE	The [virtual objects] belonged to the [virtual environment].
15	VO-RE	The [virtual objects] belonged to the [real environment].
16	VO-RO	I could not distinguish between [real objects] and [virtual objects].
17	VO-VO	The [virtual objects] were part of the same space.
18	VO-RA	[Agents] in the environment were in the same space as the [virtual objects]
19	VO-VA	Virtual [agents] were in the same space as the [virtual objects]
20	VE-RO	The [real objects] belonged to the [virtual environment].
21	VE-RA	The [agents] belonged to the virtual environment.
22	VE-VA	The virtually presented [agents] belonged to the [virtual environment].
23	VE-RE	[Virtual and real environments] formed one, common space.
24	VE-VE	The virtual environments presented belonged to each other.
25	RE-RO	The [real objects] belonged to the [real environment].
26	RE-RA	The [agents] were in the real environment.
27	RE-VA	The [virtually presented agents] belonged to the real environment.
28	RO-RO	The [real objects] belonged to each other
29	RO-RA	The [agents] and [real objects] were in the same environment. (The [agents] could have touched the real objects.)
30	RO-VA	The [virtually presented agents] and [real objects] were in the same environment. (The [virtually presented agents] could have touched the real objects.)
31	RA-RA	The [other agents] could have communicated with each other.
32	RA-VA	The [other agents] could have communicated with the [virtually presented ones].
33	VA-VA	The [other virtually presented agents] could have communicated with each other.

End of Technical Report.