The challenge of implementing SDH in immersive media: a reception study

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Media 4 All 8 – Stockholm, 2019
This study is focused on 360º videos
main challenges
Main challenges

- Position
- Guiding mechanisms
- Freedom to explore
- Avoid breaking immersion
- Readability and usability
- Scalability (editing tools)
ImAc Project

Creating accessible and fully personalized services for all citizens

ENABLING NEW IMMERSIVE NARRATIVE EXPERIENCES

Read news
Based on...

• State-of-the-art (BBC/TNYT)
• Related work (BBC WP/Sylvia Rothe et al)
• Users’ feedback
  • Focus groups
  • Prepilots (trial and error)
  • Testing with end users

...We developed different solutions
reception

study
20 HoH | 20 hearing

26 ♀ | 14 ♂

[Age] sd=14.8, mean=37.4, median=37 (from 18 to 70)

[VR device owners] 5 participants

13 never use [=] | 27 use [=]
What?
**Stimuli**
- One clip for acclimatization
- Four clips for testing – two comparable pairs
- Two episodes of Holy Land by Ryot (documentary, narrator)
- “I, Philip” by ARTE (sci-fi, different characters) split in two parts
- Duration: around 5 minutes each clip
- Without sound

**Variables**
- Position: Always visible vs Fixed in three positions
- Guiding: Arrows vs radar
How?
[Device] Samsung Gear VR with Samsung Galaxy S7

[Measures] Immersion (IPQ) + Preferences

[Tools] Questionnaires (GForms)

[Tools] CVR Analyzer (by Sylvia Rothe et al)
results
position
What system do you prefer to read subtitles in 360º videos?

- **Always visible**: 33
- **Fixed positioned**: 7
Always visible

- More freedom to look around
- You don’t miss the subtitle content or parts of the scenes
- These are more comfortable

Fixed positioned

- These can be read better
- They avoid the dizziness effect
Which one is easier to find and to read? (7-point Likert scale)

**Always-visible subtitles** (mean=6.01) were considered easier to find than fixed-positioned subtitles (mean=3.92). This difference is statistically significant (Z=-3.986, \( p = .000 \), ties=5).

**Always-visible subtitles** (mean=5.19) were considered easier to read than fixed-positioned subtitles (mean=4.30). This difference is statistically significant (Z=-1.919, \( p = .055 \), ties=9).
Which one is less obstructive and less distracting? (7-point Likert scale)

Fixed-positioned subtitles (mean=5.71) were considered slightly less obstructive than always-visible subtitles (mean=4.97). This difference is not statistically significant ($Z=-1.123$, $p=.261$, ties=23)

Always-visible subtitles (mean=4.76) were considered less distracting than fixed-positioned subtitles (mean=3.00). This difference is statistically significant ($Z=-2.696$, $p=.007$, ties=13).
For the spatial, involvement and realness scale, the test indicated that the difference between results is not statistically significant.

However, for the presence scale, the test indicated that the difference between results is statistically significant ($Z=2.694$, $p=.007$, ties=17).

This means that the fixed-positioned subtitles had a negative impact on the presence of participants.

According to their comments in the open questions, this could be because they felt less free to explore the 360º scene and claimed to have missed parts of the subtitles content. Moreover, as reported above, participants found more difficult to find and read subtitles in this mode, and also considered them more distracting.
results
guiding
Which system do you prefer to indicate the location of the character speaking?

Arrow; 33

Radar; 7
Arrows

- More intuitive, direct and comfortable
- Less invasive and distracting
- Don’t get the radar at all

Radar

- More accurate and spatial information
- Maybe adding a tutorial at the beginning
- Place the radar in the center and down, not on a side
With which one is easier to find speaker? And which one is less distracting? (7-point Likert scale)

**Arrows** (mean=5.95) were considered easier to find the speaker than the radar (mean=3.20). The difference is **statistically significant** ($Z=-4.166$, $p=.000$, ties=10).

**Arrows** (mean=6.31) were considered less distracting than the radar (mean=3.04). The difference is **statistically significant** ($Z=4.125$, $p=.000$, ties=12).
IPQ results (7-point Likert scale)

Even if the arrows were preferred by users and also considered an easier method to find the speaker as well as less distracting than the radar, that had no impact on the immersion of the participants.
in a nutshell.
Subtitles in 360° - Position

- it is important for viewers to have freedom to explore the scenes. It is important for immersion, as it has been proved.
- it is also important that subtitles are easy to find and read and do not distract the audience. That is why placing subtitles where audience are expecting them is a good idea.

Subtitles in 360° - Guidance

- split attention is intensified in 360° videos so less is more. Arrows are the simplest, most intuitive mechanism and users prefer them.
- even more: some users would prefer nothing, if the movie is well post-produced.
Future steps

• studies on cognitive load: is it possible to read subtitles with the current CpS and still pay attention to the 360° video? is it enjoyable? do viewers understand the content? do we need shorter subtitles?
• studies with eye-tracking: where are viewers looking at? can we place subtitles elsewhere to improve the user experience? or would users prefer to have subtitles always in front of them?
ImAc Player

Enjoy immersive contents with access services by selecting the video you want to watch. To customise your experience, go into settings or select a video and then go to the player menu.

Liceu Opera Piece 1  Liceu Opera Piece 2  360° Abendschau  Desconcert “Leyre”

Thank you

imac.gpac-licensing.com/player/
References

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• Association APANAH: https://www.apanah.com/
Disclaimer

TransMedia Catalonia is a research group funded by Secretaria d’Universitats i Recerca del Departament d’Empresa i Coneixement de la Generalitat de Catalunya, reference code 2017SGR113.

The project ImAc has received funding from the European Union’s Horizon 2020 Research and Innovation Programme, grant agreement No 761974.

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