

Exploring Usability and User Experience of Immersive Web VR Platforms

WordCamp Zurich 2019

About me



2019, Lugano



2019, Lugano/ Milan

Erasmus
University
Rotterdam



2018, Rotterdam



2018, Zug/Zurich



2016, Como



2018, Lugano

About this research

Università della Svizzera italiana
Faculty of Communication Sciences
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Exploring usability and user experience of immersive
web VR platforms for tourism destinations applying the
MILE+ evaluation method

The case of Petra's and Bilbao's immersive VR
platforms

Master's Thesis of
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Assessing usability and user experience of immersive web VR platforms for tourism destinations

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Abstract. Until recently, Virtual Reality (VR) was considered as a niche technology due to slow advancement and high costs. However, thanks to new industry improvements, VR has started to approach the mainstream audience especially through the use of web VR, therefore becoming a new tool for communication. In this sense, due to its content richness and emotional density, the tourism industry reveals as a proper one to exploit the new opportunities coming from web VR. As a result, it becomes imperative to research usability and user experience of web VR platforms for tourism destinations. Despite this importance, standards and guidelines on the topic are still missing. This paper focuses on exploring usability and user experience issues of two web VR experiences devoted to tourism destinations, namely Petra, the ancient city in Jordan, and Bilbao in Spain. The methodology used for this research is based on two sets of VR heuristics applied to the MILE+ usability evaluation method. Merging these two methodologies has allowed to explore both technical, application independent issues, as well as user experience-related, application dependent issues. Finally, guidelines on usability and user experience factors is proposed, as a first step towards the preparation of a complete list of guiding principles on this topic.

Keywords: web VR, Usability and User Experience Research, Tourism Destination.

1 Introduction

It hasn't been long since virtual reality (VR) was serving only limited users in few industries, mainly in military trainings and medical environments (Murta, Monroe, & Youmans, 2017). In the last years, this scenario has changed due to novel improvements like the web VR, allowing users to access a VR experience simply through the internet browser either with or without a VR headset. The easy access to VR through the web opens the stage to a new tool for communication, which is also highly engaging from an emotional point of view. In this sense, one of the fields where web VR is making its first steps is the tourism one, being a pioneer in the application of information and communication technologies (ICTs). In fact, this is not a casual choice of application, since the nature of tourism is being content rich and emotionally dense and therefore it is a proper area where to apply VR experiences. Considering both VR as a new

Why studying Usability and UX of Web
VR in Communication Management?

Web VR API

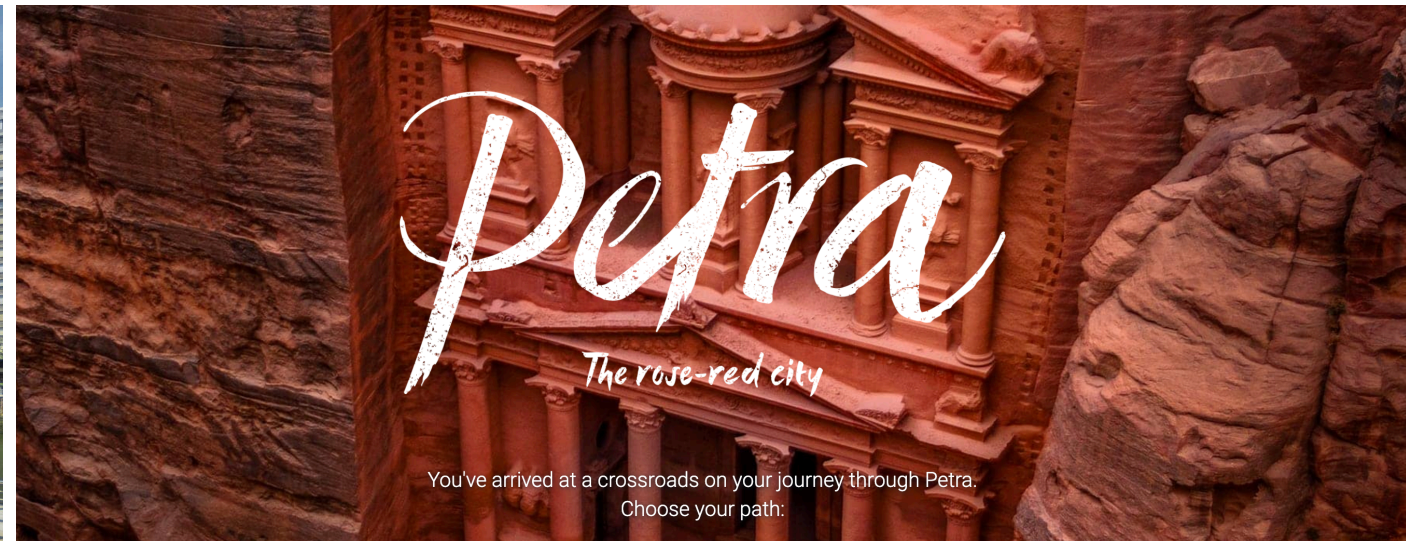
- Web VR 1.1 API available to developers until July 2018
- Web XR API allow immersive experience for VR and AR devices

Web VR opens the doors of immersive experiences to everyone

Usability & UX for Web VR



The industrial port city of Bilbao in Spain




The ancient city of Petra in Jordan

The Problem

Standards and guidelines on usability and user experience
of web VR platforms are missing

The Dynamics



The company

Design
& development

Final users

The Aim

RQ 1: Find the main issues that threaten the usability of each web VR 360 experience.

RQ 2: Find the common patterns of issues present in the web VR 360 experiences.

RQ 3: Asses the end-users' satisfaction with the web VR experiences.

Usability vs. User Experience

What is Usability?

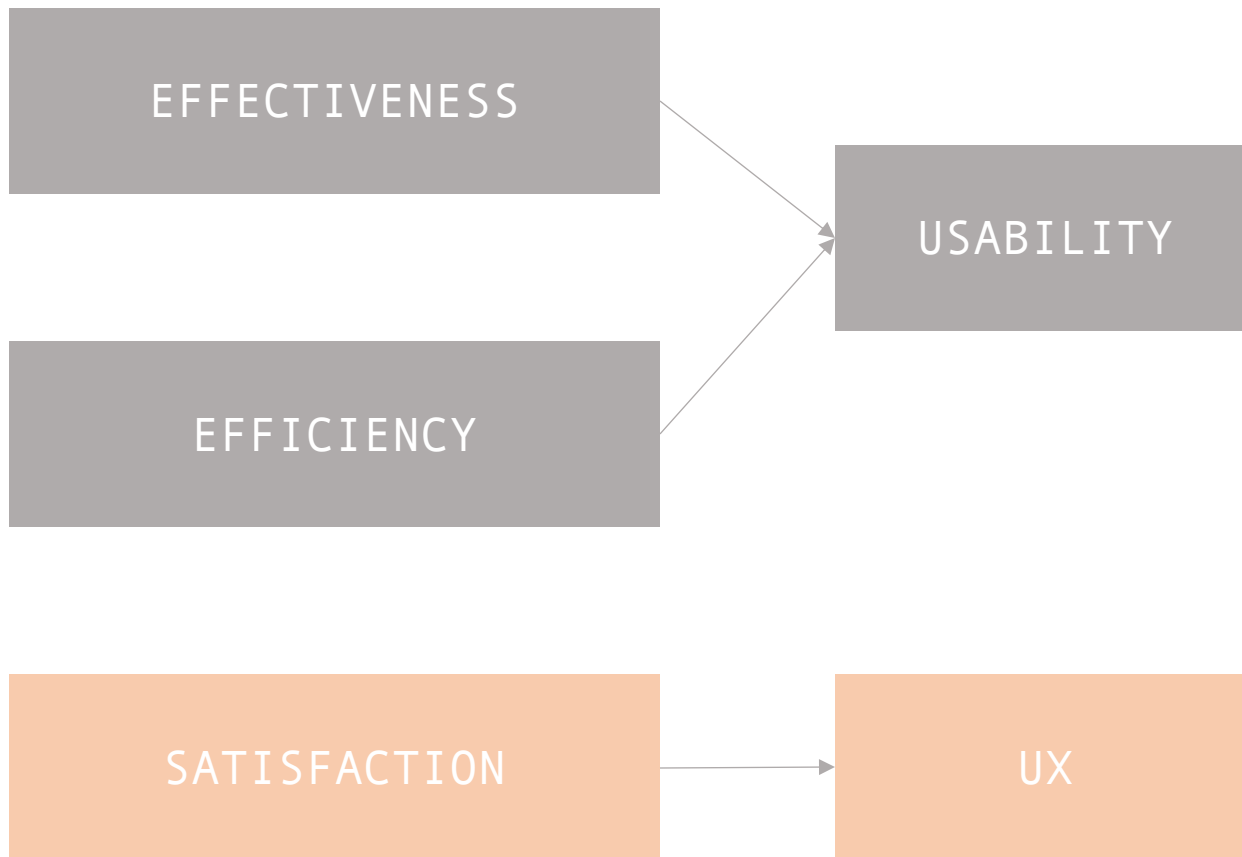
EFFECTIVENESS

EFFICIENCY

SATISFACTION

Usability - the extent to which a system, product or service can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specific context of use." (ISO, last update 2018)

From Usability to User Experience

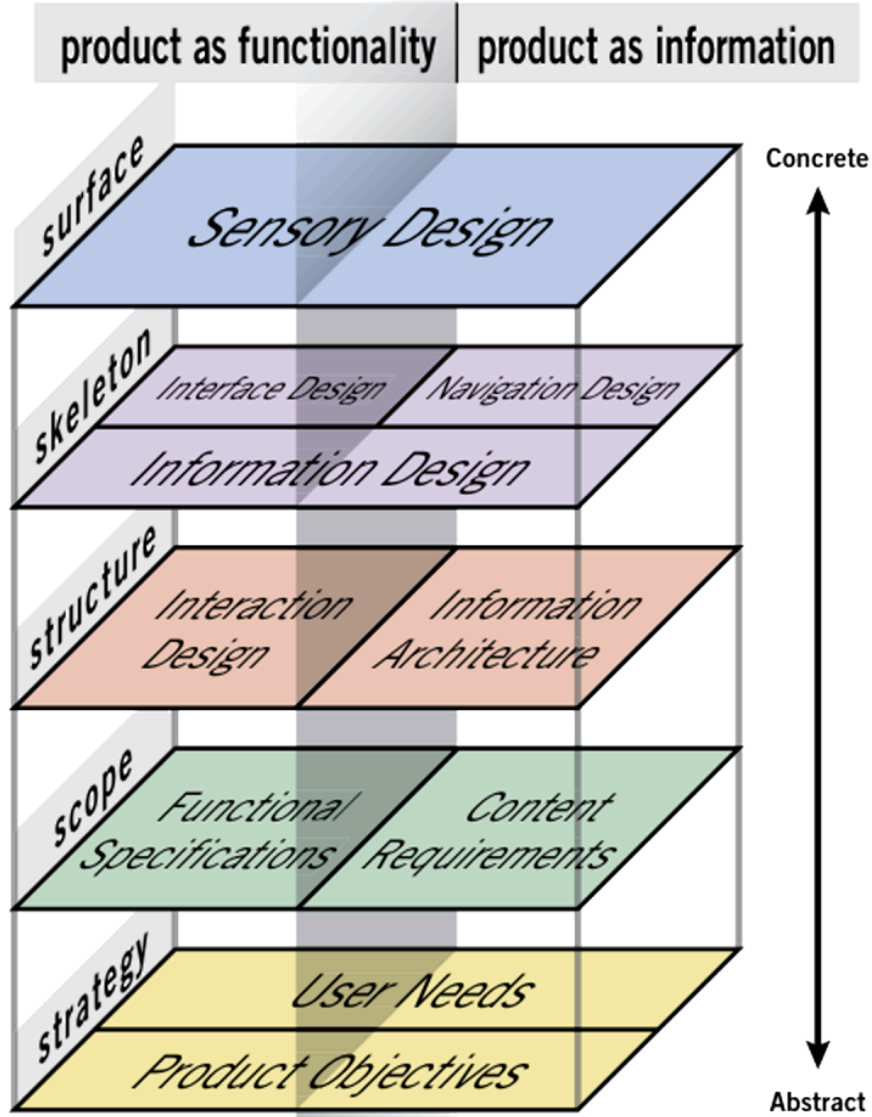


Usability is concerned with the effectiveness and efficiency of an interaction, whereas user experience is connected to the emotional and personal side of use (Bevan et al., 2015)

User Experience

User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use.” (ISO, 2010)

Usability, when interpreted from the perspective of the users' personal goals, can include the kind of perceptual and emotional aspects typically associated with user experience. Usability criteria can be used to assess aspects of user experience.” (ISO, 2010)



The Elements of UX



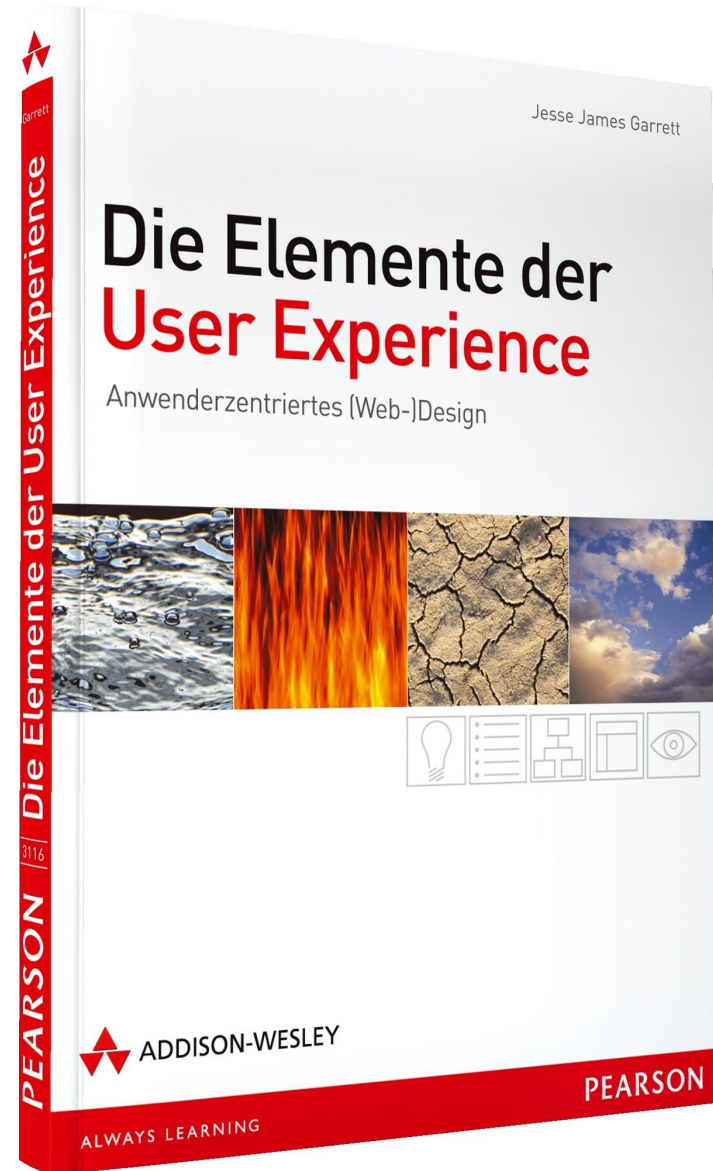
THE **ELEMENTS** OF **USER EXPERIENCE**



SECOND EDITION

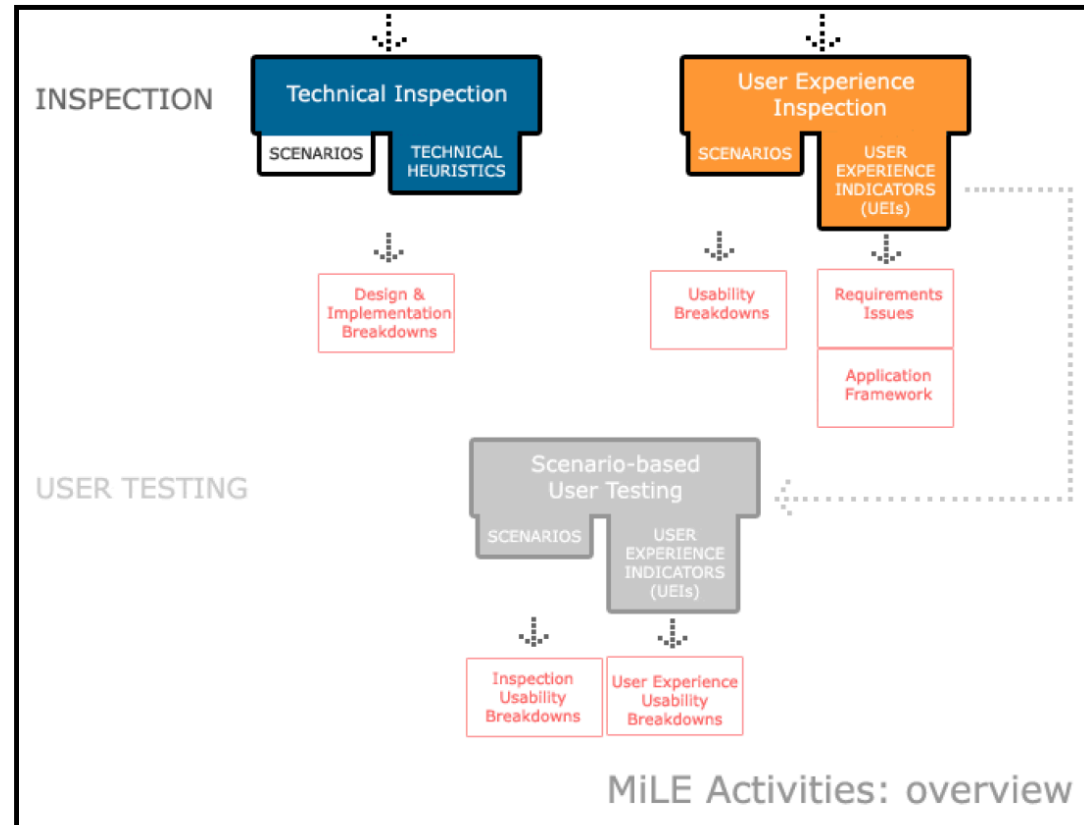
USER-CENTERED DESIGN
FOR THE WEB AND BEYOND

Jesse James Garrett




The Methodology

Milano Lugano Evaluation Method



Usability
evaluation
framework



Heuristic
Evaluation
Method

Heuristic evaluation of virtual reality applications

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Received 25 July 2003; revised 30 April 2004; accepted 1 May 2004

Available online 20 June 2004

Heuristic evaluation of virtual reality applications

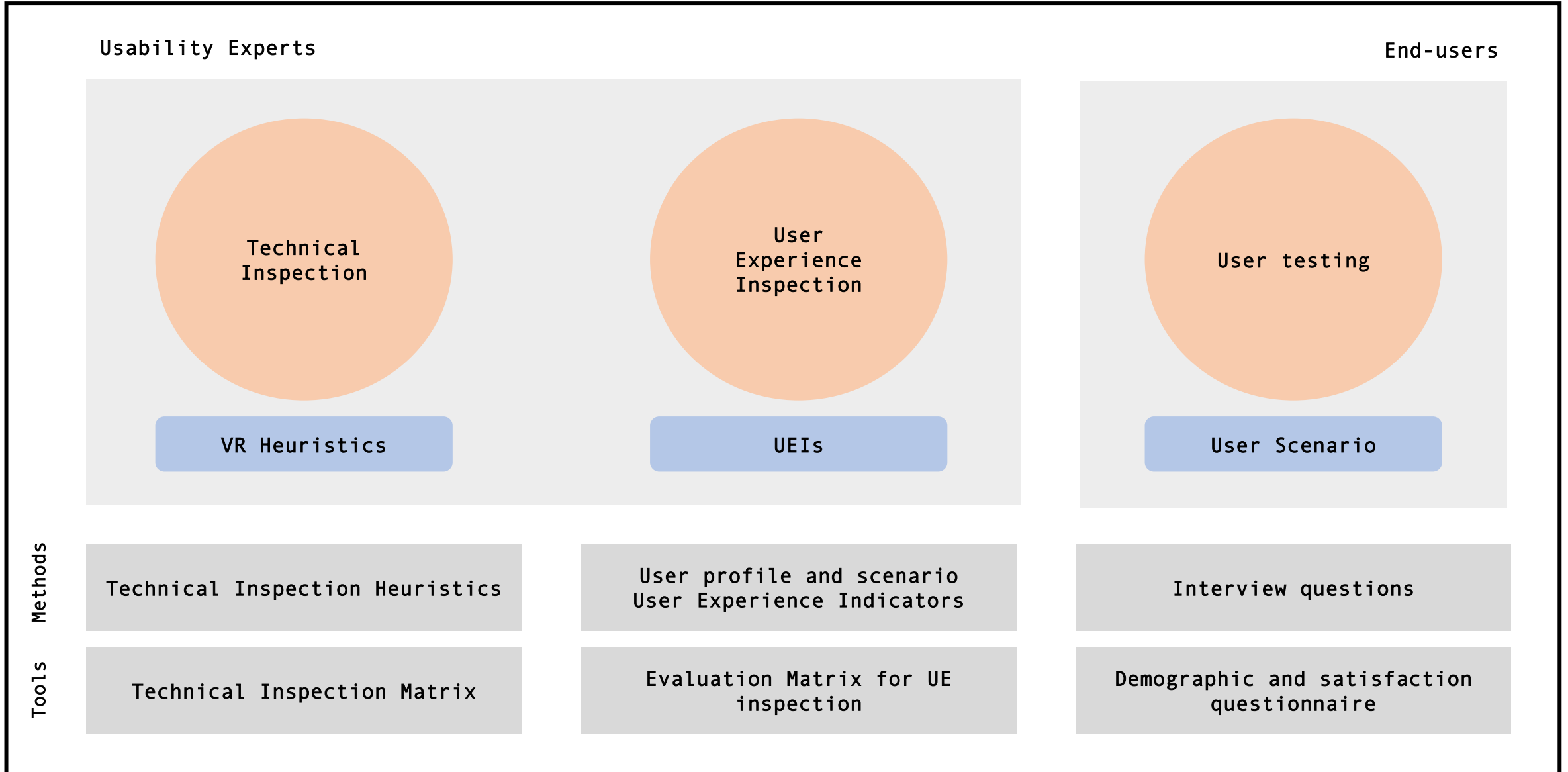
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MiLE+ Evaluation Method



The Process

Technical Inspection Issues

Experts	Navigation	Content	Tech Performance	Interface Design	Overall performance
E01	3	6	6	9	6
E02	9	6	6	9	7.5
E03	3	6	9	6	6
E04	3	6	9	6	6
Mean score	4.5	6	7.5	7.5	6.37

Table 12 Scores for Technical Inspection of Petra

User Experience Inspection Issues

Tasks	Content Experience		Navigation Experience		Interaction Flow Experience		Overall Performance
	E01	E02	E01	E02	E01	E02	
Task 1	9	9	6	9	9	9	8.5
Task 2	9	9	6	6	3	9	7
Task 3	6	9	6	6	9	9	7.5
Task 4	0	0	0	0	0	0	Unsuccessful
Mean Score	6	6.75	4.5	5.25	5.25	6.75	5.75

Table 14 Scores for User Experience Inspection of Petra

End-Users' Issues

Users	Navigation experience	Content experience	Interaction flow experience	Overall performance
U01	9	6	6	7
U02	9	9	6	8
Mean score	9	7.5	6	7.5

Table 20 Scores of User Testing for Petra

Main Usability Issues	Category	Dimension
Poor forward and backward feature	Orientation and navigation	Navigation
Avatar's position isn't clear	VR interaction	
Interactive objects and actions not indicated		
Direct path to desired destination not provided	Flexibility and efficiency of use	
More in-depth content for points of interest is required	Average text coverage	Content
Zoom in on points of interest isn't possible	Average faithful viewpoints	Technology
No technology performance errors encountered	Good technological performance	
Heterogeneity of messages is overloading	Average information overload	Interface Design
Therefore, the interaction with the environment isn't simple	Average simplicity	
And the clear access to main functionalities isn't provided	Average clarity	

Table 13 Main Usability Issues for Petra

Main User Experience Issues	Category	Dimension
Mismatches between content and imagery encountered	Average completeness	Content experience
Unclear purpose of the platform	Average understandability	Navigation experience
Direct access to a point of interest impossible	Average predictability of content	
Limited viewpoints and naturalness of the scene	Average naturalness	Interaction flow
Unable to attain a user's goal therefore not completely satisfied	Average effectiveness	
	Average satisfaction	

Table 15 Main User Experience Issues for Petra

Main User Experience Issues	Dimension	Category
Audio guide at the very beginning is distracting	Content experience	Information overload
Headset performance	Navigation & cognitive experience	Average faithful viewpoints
Map indicating the position at any time was missing	Interaction flow experience	Average effectiveness
Interactive objects to help navigation right from the beginning were missing		Average effectiveness

Table 21 Main User Experience Issues from User Testing for Petra

The Results

Common patterns of issues

Usability Issues

- (1) Clear understanding of avatar's position at any point
- (2) More in-depth content for both platforms
- (3) The faithful viewpoints weren't satisfactory
- (4) Need for balancing the information load of the interface design

User Experience Issues

- (1) Better distribution and architecture of the content required
- (2) Clear purpose of the platforms is missing
- (3) Inefficiency in terms of tasks completion

User Testing Issues

- (1) Content distribution is not sufficiently thought through
- (2) Images were not vivid enough
- (3) Poor interactivity with objects leads to less natural perception

Research Conclusions

Factors of improvement

1. Having a clear map of avatar's position at any point easily accessible on the screen.
2. Being able to instantly access from one point to another directly from the menu.
3. Having clear indications of what can be found in any different scene through text labels or images.
4. Having clear indications of interactive objects with the help of arrows, buttons, signs, and color.
5. Having the forward and backward navigation feature always easily accessible on the screen.
6. Being able to get additional in-depth information on specific points of interest.
7. Having a balanced distribution of information without overloading with heterogenous tools like text and audio.
8. Provide a way to mark the already visited scenes in the menu or on the map.
9. Being able to explore a scene from more than one perspective through different angles or additional images.

UX & WordPress

- Managerial implications

UX & Blockchain

- The adoption game

Let's discuss!

Thank you!

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