Ora sì ch'io son contenta: sembra fatto inver per me - Identifying User Requirements for Wearable Augmented Reality at Opera

Barbara Balbi
Institute for Research on Innovation and Services for Development (IRISS-CNR)
Naples, Italy
b.balbi@iriss.cnr.it

Alessandra Marasco
Institute for Research on Innovation and Services for Development (IRISS-CNR)
Naples, Italy
a.marasco@iriss.cnr.it

ABSTRACT

The purpose of this study is to propose a User Experience (UX) model to support the design of a wearable Augmented Reality (AR) application for Opera. To this end, it implements the UX approach by Hassenzahl and Tractinsky [17] and User-Centered Design methods within a People Action Context Technologies (PACT) analysis. The preliminary results identify users' requirements relating to People, Actions and Contexts for a visual AR interface at Opera. The study contributes to generate useful knowledge to support the design of visual AR interfaces for predominantly hedonic contexts, such as performative arts. Further, being among the first to investigate UX for wearable AR at Opera, this study provides a foundation for the implementation of wearable digital applications in this context.

KEYWORDS

Augmented Reality, Visual Interfaces, User Experience, Hedonic, Opera

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1 INTRODUCTION

Recently, the challenges associated to the use of AR for enhancing the consumption of arts and cultural heritage have received an increased attention [1, 7, 15, 28]. In this regard, performing arts are a relevant case in point. The complexities involved with the application of digital technologies in this context mostly derive from the predominant aesthetic and hedonic components of the users' experience [2, 5], yielding relevant implications for the design of visual interfaces.

This study aims to advance the design process of hedonic interactive products, based on an exploratory research conducted in the context of (Italian) Opera. In particular, the purpose of this study is to propose a UX model to support the design of a wearable AR application for Opera.

Despite the growing interest for hedonic quality in Human-Computer Interaction (HCI), studies providing knowledge to design for hedonic are still limited [9]. Indeed, according to the review by Diefenbach et al. [9], 33% on a total of 151 articles referred to hedonics within the background literature, but only once and not as a central issue. Further, their review highlighted that hedonic is generally considered only as a part of UX frameworks/models. Interestingly, hedonic is always addressed as resulting from the users' experience of the product under evaluation (i.e. assessment of users' perceived hedonic quality) and not as a foreground concept per se that needs to be taken into account before and beyond the instrumental [9]. Therefore, they highlight the need for more elaborated approaches to design for hedonic. With specific regard to the design of digital applications for culture and heritage, it is stressed that the successful implementation of AR requires an adequate understanding of requirements from a users' point of view [28]. However, the literature highlights that research on UX methods in this context is still limited [15, 28]. Further, hedonic is addressed as a part of attributes in established models within the evaluation of the product. In particular, as in Hassenzahl and Tractinsky [17], the hedonic aspects are identified as distinct from the pragmatic ones.

However, when digital applications are aimed at supporting cultural experiences, the interaction implies a resemiotization [27], in which the pragmatic aspects are to be consistent with the aesthetic experience. Therefore, *Hedonic* cannot be limited to tools of pleasure and stimulation, but should be considered as a broader concept, in which the hedonic experience itself lives through a new language. According to this perspective, new methods are required to provide designers with an appropriate knowledge of users' needs and to produce results closer to users' perspective in the context under investigation.

In this direction, this study contributes to identify a methodology to design for the Hedonic based on an appropriate conceptual model and users' requirements, through a case study of wearable AR at Opera. In particular, it proposes a model in which the whole interaction design of visual interfaces is developed by integrating the Hedonic as a prerequisite. This is obtained by an in-depth knowledge of users' needs through UCD methods that inform every part of PACT analysis [3, 26] in order to achieve a virtuous circle where the HCI is enriched by the Hedonic and the Hedonic is enriched by a satisfying AR interaction. In this way, this study contributes by developing the theoretical perspective of the Hedonic of interactive products for promoting effective design process and strategy.

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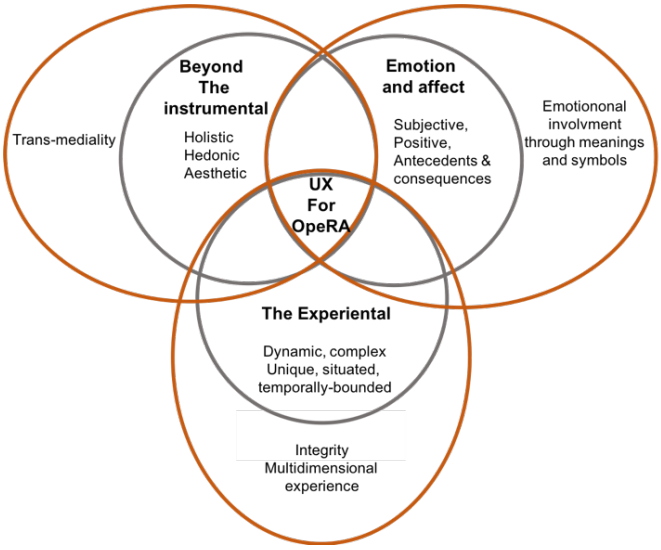

Figure 1: Adaptation of Hassenzahl and Tractinsky [17] approach to take into account the transmediality, multidimensionality and Hedonic in the experience of Opera.

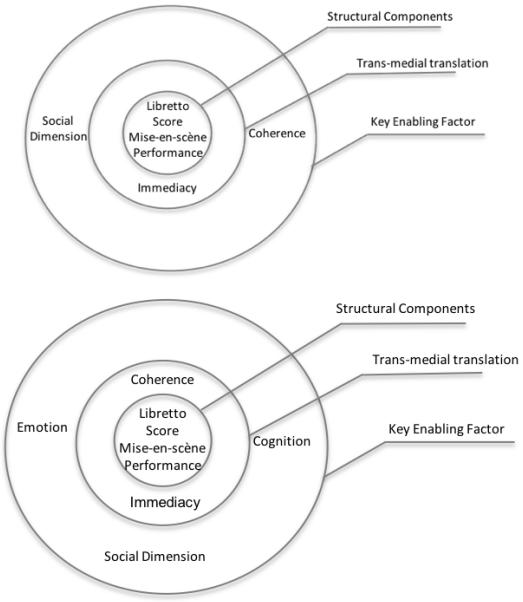

Figure 2: The dimensions of the experience at the Opera: structural components (center), transmediality (middle circle), experiential drivers (outer circle). Fig. 2:top exemplifies the specific case of Rossini's Cenerentola by Ponnelle (1980); Fig. 2:bottom summarizes the results of the synthetic analysis of 56 different references of Opera in several contexts (TV, cinema, radio, literature, technology-based contexts).

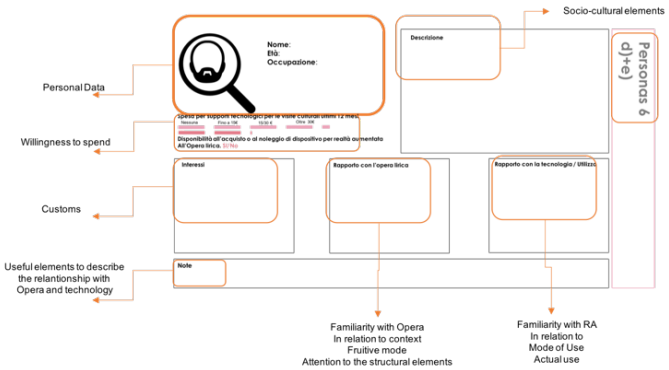

Figure 3: The elements considered for the design of Personas.

2 MATERIALS AND METHOD

The study adopted an experiential approach based on Hassenzahl and Tractinsky [17] framework to take into account the Hedonic in the Opera experience (Fig. 1). Within this general perspective, it was developed on the basis of a multidisciplinary research that intertwined cultural, semiotic, communication and social domains, in order to identify the structural components of Opera [27], its trans-medial transmission [8] in the AR application and the drivers of the experiential consumption of arts [5]. In particular, on the basis of these multidisciplinary elements, a synthetic analysis of 56 references of Opera in several contexts (TV, cinema, radio, literature, technology-based contexts) was performed, as exemplified in Fig.2:top. This approach resulted in the conceptual model depicted in Fig.2:bottom.

Following this multidisciplinary analysis, qualitative methods, including online Survey, Ethnographic Analysis, Interviews [13, 24], have been used to design Personas [6]. Fig. 3 summarizes the elements considered for the design of Personas. Coherently with the attributes identified in these Personas, a group of People was involved in focus group and Design Thinking activity. The focus group was fed by the structural components that were previously identified in relation to the experience at the Opera, in accordance with research in cultural, semiotic, communication and social domains. A Design Thinking activity [4, 10–12] supplied design of the elements of the Actions and the Moments of use related to the functionalities of the interaction with AR application.

In this way, the sessions of Design Thinking activity and Focus Groups have been supported by effective materials to provide a clearer picture of the context of interaction according with the multidisciplinary research mentioned above.

3 PRELIMINARY FINDINGS AND DISCUSSION

Based on this process and methods, a UX model aimed to support the design of the digital application at Opera has been created. In particular, we present the preliminary results relating to the user requirements of the Persons, Activities and Context of use of the expected wearable AR application at the Opera. With regard to Persons, 7 Personas were identified and invited to participate to

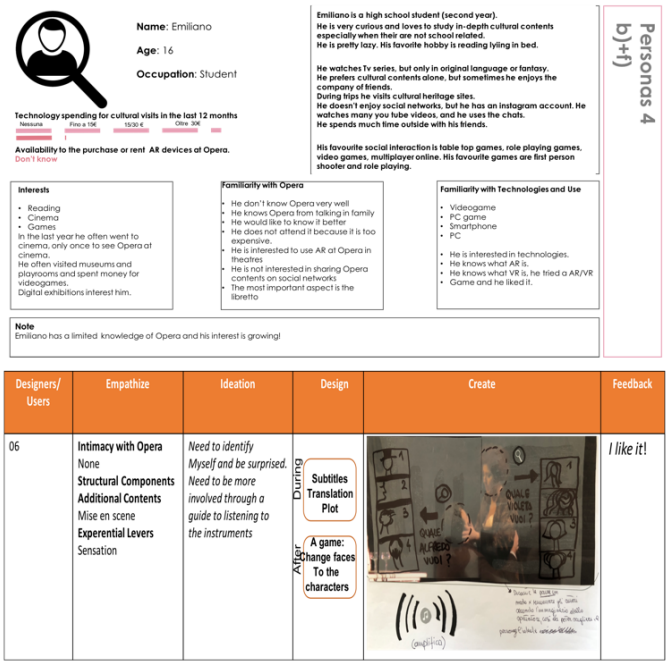

Figure 4: Materials from Personas (top) and Design Thinking sessions (bottom).

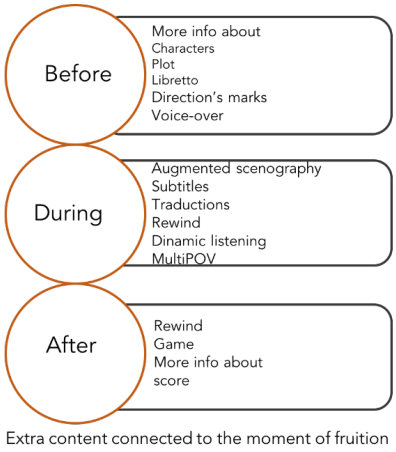

Figure 5: Extra-contents desired by users in relation to the phases of the experiential process of Opera.

Focus Groups and Design Thinking sessions. One of the identified Personas is depicted in Fig. 4:top.

In particular, results from Design Thinking sessions in pair between Personas and designers (Fig. 4:bottom for a snapshot) allowed to identify several Actions in terms of extra-contents desired by users. These include more information about text (libretto), plot, characters and score; subtitles and voice-over; director's marks; augmented scenography; games. Interestingly, the sessions allowed to relate all the extra-contents to the phases of the process of cultural consumption at Opera as described in Fig. 5. Such an approach is in line with Kuflik et al. [20] that stressed the need to better link the pre-, during, and post- visit phases of the cultural heritage experience.

Further, by assuming the Hedonic as a precondition through a multidisciplinary approach, an effective conceptual model was created to support the identification of the requirements of Persons, Actions, Contexts and Context of use to design the visual interface and the contents of the AR application for Opera. The study suggests, in particular, that the fundamental experiential levers of the hedonic experience (i.e. sensation, emotion, cognition) should be amplified by making them fully consistent with the pragmatic elements of the interaction, since the latter are able to represent users' needs only if they are consistent with their hedonic demand. Therefore, it is important to share a sound conceptual model between users and designers, especially when designing visual interfaces related to performative arts experiences.

As previous literature reports [17], "State-of-the-art machinery (graphics, sound, networks, miniaturization, etc.) allows for more than mere functionality" (p. 6). In this sense the many available approaches for UX analysis, including Product-centered models [19], User-centered models [16], Interaction models [25], do not consider the Hedonic as a prerequisite but either as an emotion determined by the use of the interface or as an interactive metaphor. In particular, to the best of our knowledge, there are no studies related to culture and heritage where the Hedonic is considered as a metalanguage as we assume in this research. The literature reveals many perspectives that involve the "hedonistic" and "aesthetic" dimensions [18], because it has been widely recognized in HCI that the analysis of the user experience should go beyond the instrumental [17]. Nevertheless, the main focus in UX studies on AR still remains usability [14, 22, 23]: the hedonic is not an intrinsic value, but it is evaluated post design [22] or by asking to users an imaginative and cognitive effort [24], or considered as a pleasure element [16].

The advantage of a multidisciplinary approach that acquires the Hedonic of experience as an intrinsic value, keeping it consistent until the end of the design process, as proposed in this study, ensures that the expectation towards an aesthetic experience remains firmly faithful to users' requirements. In this way, the visual interface (Technologies) will be designed for real users (Personas), on consistent and lasting interactive metaphors, responding to the hedonic experience (Actions and Contexts) in the same manner that grammar and words in a linguistic system are vehicles that respond to thought.

4 FUTURE STEPS

The proposed model will be validated through the further stages of experimental assessment in order to test the hedonic augmented reality experience. In line with other studies on the impact of cultural heritage experiences created with the new generation of wearable devices on behavioral intentions to visit [7, 21], this research will also analyze the influence of the perceived visual appeal and emotional involvement of augmented Opera experience on the intention to visit, i.e. to attend the Opera. For this reason, a TAM questionnaire will be used to evaluate the most pragmatic elements related

to the acceptance of the AR application, in relation to the *Hedonic* that potentially influence the intention to use the AR and to attend the Opera. In this regard, a larger sample of individuals will be selected to test the proposed model, including users and other stakeholders (e.g. Opera professionals) in order to assess its ability to identify requirements across different scenarios at Opera and cultural levels of users.

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