

Towards a Mobile Enhancement of Glocal Heritage?

Developing user experiences in relation to mobile technologies, geo-localisation and culture

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Abstract — Considering the recent media coverage and online discussions about *Niantic's Pokémon GO*, most academics and professionals would agree that it is the first app to globally popularise mobile locative media (GPS) and augmented reality (AR), raising its potential as a technological medium and as an interface to offer new possibilities for any user. This paper maps technological and user experience changes undertaken through collaboration and professional practices between creative technologists and prosumers (clients and/or users), as they designed digital environments. Based on the notion of augmented space and/or virtual environments, especially in the Tourism sector, the authors analyse how tacit knowledge and service discovery were utilised to facilitate and integrate innovative, engaging and inclusive mobile experiences. Also, whilst proposing a networked model of content creation in augmented space, this paper reflects on some of the mobile characteristics in relation to a *glocal* (term coined by Robertson in the 1990s) approach through two specific collaborative research projects: *Shangri La* and the *Mobile Innovation Network Australasia (MINA)* app.

Keywords-mobile; locative media; mixed reality; tourism; heritage; user-centred; glocal; innovation; mobiquity.

I. INTRODUCTION

Territorial attractiveness and marketing must leave the mechanical conventions of the creation of zones and the competitive race of companies to integrate with the emergence of new area projects. The territory becomes more and more a community composed of individuals participating in its development rather than bounded by managed areas, and the valuation of the region passes through the same community of individuals [28][37]. Furthermore, digital tools, such as mobile devices and social networks allow the co-creation of value and the participation of the community to the attraction of the territory and its heritage. Hence, the new collective environment can be defined as:

“the overlapping of virtual information in real space (...) mixing virtual objects generated by computers with a real environment, generating a mixed environment that can be viewed through any technological device in real time.” [10]

Research on Mixed- or Augmented-Reality (MR or AR) has been conducted in various fields including cultural heritage but the majority of studies focus on technical aspects of AR, while others are tailored to specific

applications [14]. In this paper, the authors investigate how AR content is created in this theoretical context, and how communities provide one key aspect: a participatory model of creating user presence in mobile environments that ties into Matsuda's hypothetical context. Also, with the smartphone being the “first medium to introduce AR to the mass market which has enormous potential for tourism” [1][17], this paper will specifically focus on mobile AR (m-AR), which allows users to point “the device towards physical objects in *their* surroundings and then *are* able to see additional virtual information overlaid on top of the real-world camera view through virtual annotations” [39]. Furthermore, this paper examines and reflects on two cases of AR projects in order to define a purposeful way to enhance a tourist experience.

This paper investigates how media locative content can be co-created in mobile environments, and is organised into five sections. Section 2 presents the context and some definitions of m-AR and *glocal* heritage, and Section 3 focusses on the methodology, while Section 4 develops the critical analysis of two environmental projects conceived in the early- and mid-mobile technology era. In Section 5, the results are discussed, and Section 6 convenes the conclusion.

II. M-AR, MOBIQUITY AND GLOCAL HERITAGE

This section is divided into two parts: the first part aims to define and contextualise AR and the concept of mobiquity, while the second part discusses the connections between technology, content, people and the environment.

A. Context: mobiquity

Although many definitions of AR exist, all of them agree that AR refers to any enhancement of the real environment by computer-generated content [14]. AR is a combination of real object and computer-generated data where virtual objects are blended into the real world. It means that user could see virtual and real objects coexisting in the same space. Thus, AR technologies supplement reality rather than completely replacing it [27].

With the huge and rapid adoption of smartphones [1] in the tourism sector, m-AR is the main device used by tourists. Thus m-AR participates in the rapid fostering of mobiquity system. Mobiquity is a word proposed at the beginning of the Internet relating to the mobile phone in the 1990s by Xavier Dalloz. Today, it has become a gateway

concept between the real world and the virtual world, rich in new content and services, bringing the convergence between the MOBILITY of any mobile device and the ubiquITY of the Internet [29]. This notion originates from the concept of Any Time, AnyWhere, Any Device (ATAWAD), added later by Any Content, which consists of several elements: the real world tags (tags); the modified reality (increased or decreased); the transmedia (contents adapted to the five screens); a geolocation tool with indication of the different steps to follow; an information tool at every stage that enriches the reality; and an interactive tool through which the tourist-local-user-politician can post a comment, enrich the content, in visual, textual form. This mobile system allows any tourist to become an ambassador of the territory and users to interact with the actual environment while displaying virtual information at the same time [30]. Buxton [5][6] even argues:

"(...) that ubiquitous technologies are enacting a shift in the way that places are encountered and understood. Added to this, places across the planet are increasingly facing 'wicked' problems – issues that are difficult to solve by traditional methods and approaches."

B. *m-AR in the context of glocal heritage*

In general, the term of heritage refers to the study of everything that is inherited and recovered to remain through the medium of archeology, art, tradition, religious and culture. Cultural heritage is one of the valuable assets that need to be preserved and protected for the future generation.

A wide body of literature identifies that smartphones or AR enabled PC tablets that are applied to cultural heritage can help cultural and urban development in two main ways: by overlaying a map with drawings, graphics, physical models, audio files and digital simulations that helps non-expert users to understand a culturally complex phenomena; and by integrating virtual elements in conjunction with a specific site in order to visualise historical details that helps to increase the awareness of a place on the basis of its uniqueness, as opposed to merely visible. This is a new culture of fulfilling the potential of a place and promoting its tourism industry [2][12].

Digital AR technologies and possibilities (such as bluetooth, wifi and/or geo-location coordinates, gyroscopic information) [7] and pervasive media such as mobile phones [1] in the field of tourism contributes to the "re-enact of historical monuments to reproduce on site historical places as in the golden period" [11]. Tourists can gain many benefits from those mobile technologies, offering them new interactive and highly dynamic experience [31][32]. It opens up a glocal territory [35], in terms of an hybridisation between one local space and a global appropriation by mobile travelers.

III. THE METHODOLOGY

Due to the complex nature of the technology development and during the early stages of the analysed project, the authors employed a heuristic form of research where "the research process is designed for the exploration

and interpretation of experience, which uses the self of the researcher" [16]. After narrowing down areas, the heuristic model evolved into a design-led methodology incorporating "research methods that imbues the full spectrum of innovation activities with a human-centred design ethos" [4]. This was to allow a systematic approach to the practice-led research that utilises a rinse-and-repeat method. The broad framework for all design-led research is analysis and synthesis.

"Analysis relates to the methods of investigation, enquiry and understanding central to the research of a project brief, concept or a particular context. Synthesis, meanwhile, is the means by which a designer is able to draw upon his or her initial analytical work and investigation to produce meaningful solutions or interventions." [26]

However, the collaborative element of the two proposed projects needs to be clearly defined. Then, users' experience of being active members within an authentic professional glocal community of practice can provide new environmental experience for the majority of participants, including professionals or amateurs [8].

Also, ethnography via mainly participant observations, qualitative inquiry conducted via written or oral discussions, and hermeneutic (Heidegger) interpretation methods supports the following analysis of the users presence, actions and interactions in mobile environment in order to draw an adequate but not complete synthesis.

IV. Two examples

Following are two examples of mobile-based collaborative research projects: the first one was conceptualised and developed in 2011, during the very early stages of mobile environment development and the second one was created late 2012.

A. *Shangri La* - an experience in Virtual Reality [2011]. This project was developed by Virtuo Ltd in collaboration with Māori-Samoan artist Lonnie Hutchinson on New Zealand's first outdoor virtual binocular experience in Wellington. The artwork *Shangri La* is located in Chew Lane, at the heart of Wellington City. The concept is based on historical facts: before the settlement of Wellington, the area of land that Chews Lane occupies was originally the seabed and shoreline. The original bay was surrounded in native bush which was also known for its towering Totara trees. In order to acknowledge the areas Māori cultural and natural history, *Shangri La* was developed as a series of animations that observed and propositioned the physical architecture of the Chews Lane by embedding a conceptual landscape and stories, which weave their way around the lane [21]. In terms of user experience, any *flâneur* is invited to view or gaze the environment through the binocular. The binocular can be rotated left or right approximately 360 degrees and up and down approximately 30 degrees. There are black and white motifs in the canvas image. When the binocular is held stationary over these motifs a crosshair

appears (much like the crosshair on a camera when taking a photo), which triggers an animation.

B. Mobile Innovation Network Australasia (MINA) app – New Zealand [2012/2013]

The *MINA* app is a collaboration between *MINA*, an Australasian-based network that creates interactions between people, content and the creative industries, and *Snapr*, which brings together photos/videos from a range of different apps. The joint-creation of the app came initially from a need of the *24 Frames 24 Hours* project, which engages with local communities around the world through mobile-filmmaking workshops. Originally, participants used mobile-filmmaking via their smartphone as a means of cultural expression. However, the process of filming, downloading the footage on a computer and then uploading it online became tedious and frustrating for participants. By using the metadata (i.e., GPS) of each new mobile short video clips created, the app can automatically and systematically upload and place the content on *Google Maps*. Hence, participants are empowered to shape representations about themselves and their communities, while connecting and representing seamlessly a specific place or location, “through a kind of no strings attached virtual proximity and co-presence” [34]. This mobile project focuses on bringing amateur and/or professional filmmakers together via a social geo-locative platform and fostering a community of practice thanks to creative practices [8][18].

V. RESULTS

Both projects are based on most of the key mobile benefits defined by Ahonen [1]: mobile is the first personal mass media; always connected; always carried; available at creative impulse; as most accurate audience info; captures social context of consumption; enables AR; and offers digital interface (to real world).

Shangri-La was conceived as an m-AR installation in order to invite any user to merge historical and contemporary realities and events. Unfortunately, due mainly to technical issues in relation to some of the limitation of 2011’s technologies and their costs; the project *Shangri-La* needed to scale down some of its ambitions while keeping its first intention as authentic as possible: the choice of 3D animation and pre-rendered VR was prioritised over m-AR and live data [3]. However, collaboration between an artist, some creative technologist and an engineer [20] resulted into a relevant and pertinent locative attraction and community interaction for Wellington City.

The *MINA* app reached its use optimisation and momentum after hurricane Sandy (late 2012, early 2013): a few people contributed to the documentation of the semi-permanent landscape of devastation and reconstruction thanks to their mobile devices and the *MINA* app. The app served as a catalyst for more dialogue between people, local bodies and insurance companies. The *MINA* app development is in hibernation at the moment however it is easy to imagine that the next step of such a project is to get

a direct link with *Google Street view* to provide users a live m-AR experience on any site or to outfit participants with an immersive experience thanks to *Google Cardboard*, for instance. In this case, mobile functionality, and mobile capability provides an interfaces between international people and local content by virtue of a global collaborative and creative project.

In both cases, the key attributes and functionality of mobile technologies, although used at its early stage, are about enhancing user experience in relation to their settings, to their spatial coordinates. While there is more and more suspicion and awareness of big data and surveillance, the authors are cognisant of arising ethical questions and concur with Buxton’s perspective:

“My work at each of these places was to collaboratively create a mobile based user experience which supported the spirit of that place, and the work of those associated with it.” [5][6]

Also, based on Stedman [35], Director of the Human Dimensions Research Unit –Cornell University, who declared that “understanding place in its true complexity is a multidisciplinary exercise”, the authors argue that historical, political, sociological and economical meanings highly influence one’s perception about a specific location through the lens of a mobile device. The main idea raised from the authors’ experiences resides in developing user experiences in relation to mobile technologies, geo-localisation and culture. As Matsuda wrote:

“Like photography, the design of AR environments has been democratized (...) everyone participates in its consumption and creation. The augmented space is truly a spatial expression of the people who live in it.” [23].

Furthermore, across various papers or article focusing on emerging mobile technologies [4][9][36][39], Buxton [6] noted that only a few “cite authors such as Rose (2002) or Somerville (2007, 2010) in their work – however many of these themes are the same i.e. embodiment, practice, interconnection and permeability. Today’s technologies bridge between worlds using the body and screens (portals) as points of connection.”

Referring back to *Pokemon Go* and based on the finding of the *Shangri-La* and *MINA* app projects, the authors concur with Rieser [32] and Haque [15] who highlighted that different forms of ‘invisible’ technologies and data are shifting people’s relationship to spaces and places and that society is evolving from perceiving its surroundings as ‘static’ and ‘dead’, to an environment which is rather ‘fluid’, ‘dynamic’ and inherently interactive, and where technology has been so integrated into the environment that it is no longer visible [9].

VI. CONCLUSION

In this paper, the authors contextualised and defined the notion of m-AR, mobiquity and glocal heritage in relation to user experience; they discussed their methodological approach based on phenomenology and qualitative data;

they reflected upon two environmental projects conceived using early mobile technologies and capabilities and highlighted the importance of collaboration [20] to facilitate and integrate innovative, engaging and inclusive mobile experiences.

A process-driven creative approach can question the existing linearity of creation and user experience in mobile environment, as well as multiple perspective contributions. Therefore, the authors argue that co-creation and multi-disciplinary collaborations enrich and enhance interactive environments, and enhance the potential of user experience in tourism [25]. Following is a pertinent quote from Holliday, that summarises this position:

“Engineers are efficient problem solvers. Business people think short term. Designers want things to be elegant and beautiful. All three need to create collaboration and harmony, and honor the value each other brings. There needs to be a new kind of ‘multi-dimensional’ approach to design that is yet to be invented.” —Linda Holliday (@lmholliday / CITIA)

Additionally, the concept of a general augmented space could soon be a reality with the development of AR-based technologies, such as *Magic Leap* (2010), *Google’s AR smart lenses* (2014), and *Microsoft HoloLens* (2016). Moreover, Cara Kahl [19] argue that:

“Social groups play an integral part in establishing creativity. Their perception and evaluation processes may be hard to decipher in an increasingly networked world, but ignoring this complexity does not necessarily facilitate scientific comprehension of creativity. This notion implies adopting a relational approach to investigating it. And taking the phenomenon for what we make of it: a dynamical construct based on social stimulation and judgment processes”.

The critical analysis and the results developed in this paper lead the author to state that the notion of prosumers needs to be addressed in the wider context of tourism, from a political and cultural perspective in order to design a coalition for a new social reality. For instance, mobile AR, VR or MR should allow for more interactive experience, and less passive connection such as traditional in-situ or online content delivery. Beyond mobile AR, MR and VR, shall we start investigating about the *phygital*, a combination of physical and digital?

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REFERENCES

- [1] Ahonen, T. (2011). *Insiders’ guide to mobile*. Chicago: TomiAhonen Consulting.
- [2] Alba, A. (2014). *Virtual reality moves past gaming to sell travel destinations, hotels*. Retrieved from <http://www.nydailynews.com/news/world/virtual-reality-moves-gaming-preview-travel-hotels-article-1.2038240>
- [3] Bellini, H., Chen, W., et al. (2016). *Virtual & Augmented Reality: Understanding the race for the next computing platform*. Retrieved from <https://360.gs.com/gportal/home/fdk/?st=1&n=%2Fportal%2Fannouncement%2Fresearch%2>
- [4] Brown, T. (2008). *Design thinking*. Harvard Business Review.
- [5] Buxton, M. (2015). *Practicing place with locative mobile technology*, Whanake: The Pacific Journal of Community Development, 1(1), pp. 29-38.
- [6] Buxton, M. (2015). *Tricksters, Technology and Spirit: Practising Place in Aotearoa-New Zealand*. (PhD Thesis / AUT University)
- [7] Bystrom, K.-E., Barfield, W., and Hendrix, C. (1999). *A Conceptual Model of the Sense of Presence in Virtual Environments*. *Presence: Teleoperators and Virtual Environments*, 8(2), pp. 241–244. doi:10.1162/105474699566107
- [8] Cochrane, T., Narayan, V. and Antonczak, L. (2015). *Designing Collaborative Learning Environments Using Mobile AR*. In S. Carliner, C. Fulford & N. Ostashewski (Eds.), *Proceedings of EdMedia: World Conference on Educational Media and Technology 2015* (pp. 1394-1402). Association for the Advancement of Computing in Education (AACE).
- [9] Deuze, M. (2012). *Media life*. Cambridge, UK: Polity.
- [10] Fonseca, D., Redondo, E., Puig, J., Villagrana, S., and Navarro, I. (2014). *Augmented and Geo-located information in architectural educational framework*. 16th International Conference on Human-Computer Interaction in Virtual, Augmented and Mixed Reality, R. Shumaker (Eds.). *Human-Computer Interaction, Part II, HCII 2014, LNCS, 8526*, 15.
- [11] Fritz, F., Susperregui, A. and Linaza, M.T. (2005). *Enhancing cultural tourism experiences with augmented reality technologies*. in the 6th International Symposium on Virtual Reality, Archaeology and Cultural Heritage VAST. Retrieved from <http://public-repository.epoch-net.org/publications/VAST2005/shortpapers/short2005.pdf>
- [12] Garau, C. (2014). *From Territory to Smartphone: Smart Fruition of Cultural Heritage for Dynamic Tourism Development*, *Planning Practice & Research*, 29:3, pp. 238-255.
- [13] Govers, M. and Go, F.M. (2005). *Projected destination image online : website content analysis of pictures and text*, *Information Technology & Tourism*, Vol. 7 pp. 73–89.
- [14] Han, D., Jung, T., and Gibson, A. (2014). *Dublin AR: Implementing Augmented Reality (AR) in Tourism*, In Xiang, Z. and Tussyadiah, I. (eds), *Information and Communication Technologies in Tourism*, Springer International Publishing, Wien, New York, pp. 511-523 (ISBN: 978-3-319-03972-5) DOI: 10.1007/978-3-319-03973-2_37
- [15] Haque, U. (2004). *Invisible topographies*. In M. Rieser (Ed.), *The mobile audience: Media art and mobile technologies*, pp. 245-252. New York, NY: Rodopi.
- [16] Hiles, D. (2001). *Heuristic inquiry and transpersonal research*. In proceedings of the CCPE Conference, London - October, 2001. Retrieved from <http://www.psy.dmu.ac.uk/drhiles/HIpaper.htm>
- [17] Höllerer, T. H., and Feiner, S. K. (2004). *Mobile augmented reality*. In K. H & H. A (Eds.), *Telegeoinformatics: Location-*

- Based Computing Services, pp. 1–39. Taylor & Francis Books Ltd.
- [18] Jenkins, H., Ford, S., and Green, J. (2013). *Spreadable media: Creating value and meaning in a networked culture postmillennial pop*. New York, NY: NYU Press.
- [19] Kahl, C. H., da Fonseca, L. H., and Witte, E. H. (2009). *Revisiting creativity research: An investigation of contemporary approaches*. *Creativity Research Journal*, 21 (1), pp. 1-5.
- [20] Maeda, J. (2016). #DesignInTech Report 2016. Kleiner Perkins Caufield & Byers, (2016). Retrieved from <http://www.slideshare.net/kleinerperkins/design-in-tech-report-2016>
- [21] Manovich, L. (2002). *The Poetics of Augmented Space*. Retrieved from <http://manovich.net/index.php/projects/the-poetics-of-augmented-space>
- [22] Matsuda, K. (2010). *Domesti/city: The dislocated home in augmented space*. Master's thesis, University of London, London, United Kingdom. Retrieved from <http://km.cx/projects/domesticity-the-dislocated-home-in-augmented-space/>
- [23] Matsuda, K. (2015, September 23). *Keiichi Matsuda: Future ways of living* [Video file]. Retrieved from <https://www.youtube.com/watch?v=8xq5oMwgaug&t=832s>
- [24] Matsuda, K. (2016, May 19). *Hyperreality* [Video file]. Retrieved from <https://www.youtube.com/watch?v=YJg02ivYzSs>
- [25] Metz, R. (2015). *Four Important Things to Expect in Virtual Reality in 2016*. Retrieved from <http://www.technologyreview.com/news/545011/four-important-things-to-expect-in-virtual-reality-in-2016/>
- [26] Noble, I., Bestley, R. (2011) *Visual Research: An introduction to research methodologies in graphic design*. London, UK: AVA Publishing.
- [27] Noh, Z., Sunar, M. and Pan, Z. (2009). *A review on augmented reality for virtual heritage system*, 4th International Conference on E-Learning and Games: Learning by Playing. Game-based Education System Design and Development, pp. 50-61.
- [28] Nonaka, I., and Konno, N. (1998). *The concept of "ba": Building a foundation for knowledge creation*. *California management review*, 40(3), pp. 40-54.
- [29] Papetti, C. and Miranda, S. (2014). *Les nouveaux paradigmes du tourisme mobiquitaire* (The New Paradigms of the Mobiquity Tourism), Hors-série de la revue Mondes du tourisme, décembre.
- [30] Petkova, V. I., and Ehrsson, H. H. (2008). *Being There Together: Experiments on Presence in Virtual Environments*. *PloS one*, 3(12). doi:10.1371/journal.pone.0003832
- [31] Rahman, N. H. A., Khalifah, Z., and Ismail, H. N. (2016). *The role of sensory experiences in appreciating the cultural heritage attractions*. *Tourism, Leisure and Global Change*, 3, TOC-117.
- [32] Rieser, M. (2004). *Overview*. In M. Rieser (Ed.), *The mobile audience: Media art and mobile technologies*. New York, NY: Rodopi.
- [33] Robertson, R. (1995). *Glocalization: Time-Space and Homogeneity-Heterogeneity*, in Mike Featherstone, Scott Lash and Roland Robertson (eds.), *Global Modernities*, pp. 25-44. London: Sage.
- [34] Schleser, M. and Turnbridge T. (2013). *24 Frames 24 Hours*. *Ubiquity: The Journal of Pervasive Media* 2 (1&2).
- [35] Stedman, R. C. (2003). *Sense of place and forest science: Toward a program of quantitative research*. *Forest Science*, 49(6), pp. 822-829.
- [36] Sussmann, S., and Vanhegan, H. (2000). *Virtual Reality and the Tourism Product Substitution or Complement?* In Proceedings of the Eighth European Conference on Information Systems (ECIS), pp. 1077–1083. Vienna, Austria: Wirtschaftsuniversität Wien.
- [37] Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.
- [38] Witte, E. H., and Kahl, C. H. (2008). *Small Group Performance: reinterpreting proximate evaluations from an ultimate perspective*.
- [39] Yovcheva, Z., Buhalis, D., Gatzidis, C. (2012). *Smartphone Augmented Reality Applications for Tourism*, e-Review of Tourism Research (eRTR), Vol. 10, pp 63-66, No. 2, 2012.