Poke, Swipe, and Pinch: Reinventing Adaptability Across Cultures Using Mixed Technology

Linda Lim(✉)

Murdoch University, Murdoch, WA, Australia
email2enigma@yahoo.com

Abstract. This short paper covers the advent of Project Cul. The researcher examined the feasibility of support for the combined usage of mobile operating systems (including Omni-Touch device), markerless augmented reality, global systems for mobile communications (hybrid positioning systems), and cloud computing (public and community cloud). Since Project Cul is in its initial phase, the existing version aims to reinvent adaptability across cultures using mixed technology and anticipates creating a game-based learning simulator to ease the adjustment period of an individual upon relocating to his or her destination country, using an interaction method coined by the researcher as "poke, swipe, and pinch". Using this interaction method, users can experience Omni-Touch functionality by practicing accurate control of the hand on any surface or even in mid-air. A discussion of protocols to achieve the project aim, most similar work, how Project Cul is original, development methodology, and evaluation method are conducted.

Keywords: Omni-Touch device · Markerless augmented reality · Hybrid positioning systems · Public cloud · Community cloud

1 Introduction

The idea of Project Cul was first initiated by the author of this paper in an earlier paper [10], where two others co-authored in writing up the non-technical aspects and illustrating a conceptual framework respectively. Although the conceptual framework is necessary, it only serves as an initial brainstorming of the idea. The goal of this paper is to create a game-based learning simulator (Project Cul) to ease the adjustment period of an individual upon relocating to his or her destination country to foster cross-cultural comprehension and assimilation to the local scene of the destination country. Game-based learning [22], mobile technology [26], augmented reality [2, 3, 9], location-based services [20, 27], and cloud computing [7, 11, 13, 17] were applied to the development of Project Cul after some evaluation, and led to reinventing adaptability across cultures using mixed technology. Demographics (for example, Nationality, Country, Culture) and scenario factors (for example, Education, Employment) were derived from the evaluation of cross-cultural comprehension and assimilation. Design factors (for example, Units of Measure, Number and Currency

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Formats) were obtained from a combination of demographics and scenario factors. The factors to be incorporated as features of the game-based learning simulator are represented by a framework (poster).

2 Discussion of Protocols to Achieve the Project Aim

Reinventing adaptability across cultures using mixed technology was called Project Cul to simplify identification. As Project Cul is in its initial stage, there were a few constraints involved. Budget is a vital factor followed by development tools (directly related to budget) and manpower with relevant technical expertise. Since Project Cul requires more technical expertise, the author has recruited new team members with different technical skill sets to continue with the next phase of Project Cul. Project funding search and project scheduling for the next phase are in progress. Project Cul followed a set of protocols involving developing system architecture, storyboarding, wireframing, prototyping, and status quo in order to achieve the project aim.

2.1 System Architecture of Project Cul

Project Cul was built using both hardware and software. Project Cul was created using an ASUS All-in-one PC series, a Third Generation iPad, and an iPhone 4S, and Microsoft Windows 8.1 was used as the operating system for the first phase. Microsoft Visual Studio 2010 was also used for coding the applications in C# or Visual Basic and XAML (for a start) for the user interface of Project Cul. More hardware and software may be added to the existing ones when the budget permits. As Project Cul aims to be platform independent, the mobile operating systems envisioned include Android, BlackBerry OS, WebOS, iOS, Symbian, Windows Phone Professional, Windows Phone Standard, and Bada [26]. Augmented Reality (AR) comprises a real-time or real-world environment which portrays the view of the physical environment where its elements are brought out to users through the use of computer-generated input like graphics (markers), sound, video or GPS data [2, 3, 9], as opposed to virtual reality bringing people into a simulated world [14]. AR can also be described as reality which has been modified with the help of a computer to improve the viewpoint of reality [2, 3, 9]. In addition to the future of AR technology, the use of markerless AR to bring reality out to users can be enhanced with the X-Ray device [26] and the Omni-Touch device [6, 8, 12, 18, 19, 21, 26]. In the area of Global Systems for Mobile Communications, the location-based systems can be categorized into network-based, handset-based, SIM-based, and hybrid [20, 27]. To obtain the location of smartphones and tablets more accurately, hybrid positioning systems (network-based and handset-based) can be used [27]. Cloud computing involves providing hardware, software, and storage services through the network or the Internet. There are four deployment models, namely; public cloud, community cloud, hybrid cloud, and private cloud [7, 11, 13, 17]. To facilitate the ease in using cloud computing services at no or low cost, public cloud (service providers via the Internet such as Amazon AWS, Microsoft, and Google, free or offered on pay per use) [7] and community cloud (shared infrastructure among many

organizations from a particular community with common interests, managed internally, externally or third-party) [11] are preferred. The system architecture of Project Cul is illustrated in the poster.

2.2 Status Quo of Project Cul

The storyboarding, wireframing, and prototyping of Project Cul are conducted by the researcher. The current version of Project Cul introduces the game-based learning simulator to users by allowing them to navigate around a basic interface using the "poke, swipe, and pinch" method of user interaction. This basic interface allows users to understand the objective of this existing version of Project Cul, which is to reinvent adaptability across cultures using mixed technology, through a stipulated activity to be completed in one sitting.

3 Most Similar Work

Some searching was involved in finding the most similar work to Project Cul. Although there are several projects on game-based learning, but few projects are on simulating real-world scenarios and are platform independent. However, the most similar work to Project Cul is Virtual Heroes which provides effective and high quality training through simulations for learning, serious games, and virtual worlds on multi-platforms [1].

3.1 Virtual Heroes

The most similar work to Project Cul is Virtual Heroes [1]. ARA's Virtual Heroes Division has a remarkable, successful track record designing and releasing immersive, virtual-world-based serious games and Advanced Learning Technology (ALT) applications on multi-platforms. This organization is also uniquely competent to provide commercial-quality, immersive, 3D virtual world content for training and education. The ALT applications comprise serious games, virtual worlds, emergency management, preparedness training, modeling and simulation, virtual reality for learning, compliance training, and research and development [1].

3.2 SimCityEDU

The closest related work to Project Cul is SimCityEDU [5]. SimCityEDU is an online educational community based on the award-winning SimCityTM videogame and functions as a resource for classroom teachers who have a strong interest in utilizing digital platforms as a learning tool to drive student interest in STEM (Science, Technology, Engineering, and Mathematics) subjects [5].

4 How Project Cul Is Original

Project Cul is original as compared to Virtual Heroes [1] and SimCityEDU [5] in a few ways. Project Cul aims to reinvent adaptability across cultures using mixed technology, to be platform independent, and to be a game-based learning simulator. Virtual Heroes [1] is not entirely game-based and SimCityEDU [5] is not entirely a simulator. They are also not entirely platform independent. Project Cul enables users to simulate their destination countries using the "poke, swipe, and pinch" method of interaction while navigating around their preferred simulated environment, facilitated by the use of game-based learning [22], Omni-Touch device [6, 8, 12, 18, 19, 21, 26], markerless augmented reality [2, 3, 9], hybrid positioning systems [27], public cloud [7], and community cloud [11]. Project Cul assists users in the adjustment to their destination countries by aiming to incorporate gaming, learning, and simulation features as a bundle to foster cross-cultural comprehension and assimilation to the local scene of the destination country. Project Cul is compatible with a large display size when connected to a projector and a mobile phone, a tablet, a laptop or a desktop computer.

5 Development Methodology

The researcher chose a hybrid (Extreme [23] and Lean [25]) development methodology in reinventing adaptability across cultures using mixed technology. Project Cul needs regular improvements to system quality and user feedback on system responsiveness, so as to enhance productivity by employing system evaluation to present new user requests, in order to improve system efficiency. The Extreme [23] development methodology is selected as a result. Project Cul also requires doing away with waste, magnifying the learning process of development teams, making decisions based on facts instead of uncertain assumptions, producing results in a timely manner, encouraging and trusting development teams, providing customers with an overall experience of the system, and incorporating a synergistic work culture. The Lean [25] development methodology is also chosen for this purpose. ExLean development methodology (poster) is the name of this hybrid development methodology given by the researcher. This hybrid development methodology will continue to be used for building future versions of Project Cul.

6 Evaluation Method

Heuristic evaluation is decided upon to evaluate Project Cul because it can reveal major usability issues within a short period of time on a budget, by assessing against a set of ten usability principles called "heuristics", adding to the method severity ratings of design errors (frequency, impact, persistence), by a small group of potential users of Project Cul [15, 16, 24]. Scenario-based evaluation is chosen to evaluate Project Cul against specific user tasks or scenarios it is designated to support [28], while usability evaluation is selected to evaluate the degree of which Project Cul is simple and enjoyable to use [4].

7 Conclusion

This paper investigated reinventing adaptability across cultures using mixed technology. Game-based learning simulator framework, system architecture of Project Cul, storyboarding, wireframing, prototyping, status quo of Project Cul, ExLean development methodology, heuristic evaluation [15, 16, 24], scenario-based evaluation [28], and usability evaluation [4] were addressed. As Project Cul is still developing towards creating a game-based learning simulator to facilitate the adjustment of individuals to their destination countries, Omni-Touch device [6, 8, 12, 18, 19, 21, 26], markerless augmented reality [2, 3, 9], hybrid positioning systems [27], public cloud [7], and community cloud [11] are being incorporated, using the "poke, swipe, and pinch" method of user interaction. The current version of Project Cul constitutes a basic structure of the game-based learning simulator, where users can navigate around the simulator by "poking", "swiping", and "pinching" the interface.

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