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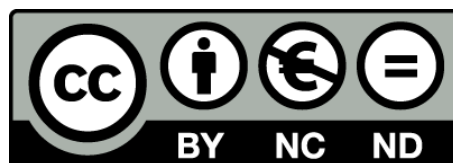
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# Co-creation of a digital game to support language revitalisation

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**Abstract.** Many Aboriginal languages are becoming extinct due to lack of fluent speakers. Computer games offer a way to help teach these languages in a fun and engaging way. However, computer games like all technology objects are based in the culture of their creators. In this paper we describe a project where we co-designed a language application for mobile phone with the Gugu Badhun, an Aboriginal community from north Queensland Australia. The participatory action research process allowed our Aboriginal partners to embed their own culture in the games, leading to a product that supported their goals and aspirations for language renewal. This collaboration has not only provided a way to sustain their language, but also added capacity to their community in ICT development.

**Keywords:** participatory action research · game based learning · cooperative design · Indigenous research methods

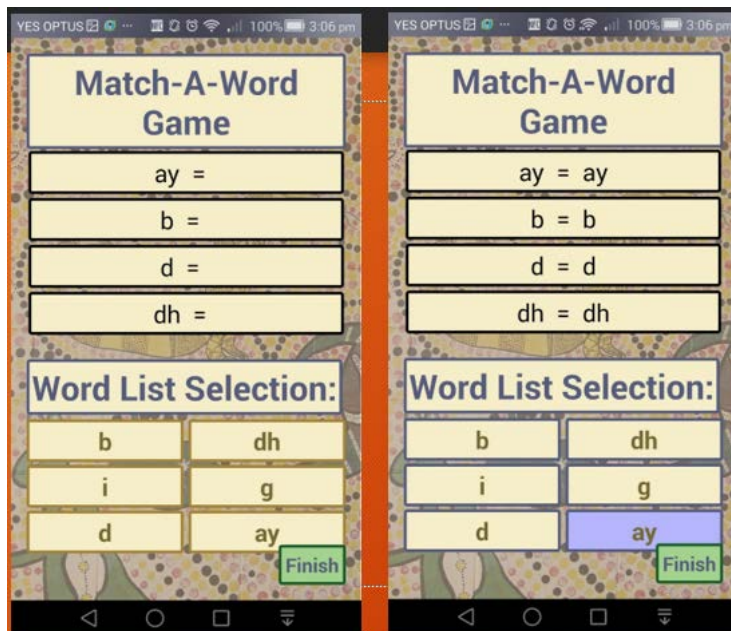
## 1 Introduction

Every day, ICT professionals are required to bridge the communication divide that exists between technologists and everyday users of technology [1, 2]. When the research team is working with members of marginalised cultures such as Indigenous peoples, this requirement becomes more challenging [3]. Much of the previous research conducted with Aboriginal people has provided little benefit to the communities involved [4], and so any new projects must ensure positive outcomes for Aboriginal people for the time they invest in the research [5].

This paper describes a participatory action research project conducted with members of the Gugu Badhun (an Australian Aboriginal language/community

group). The purpose of the project was to develop a smart phone based language teaching game that both children and adults of the group could use to learn their original language in order to aid its preservation.

The language game is an Android application created using Android Studio. The game contains a login screen, a dictionary with audio pronunciation of words, a game demo, and 34 levels which contain 270 words in all. The android application developed was created using Android Studio with Java SE 8's JDK targeting Android 4.0.3 (Kit Kat) to Android 5.0 (Lollipop). A SQLite database was used to store the dictionary of language words, the user's details, and any other data.



**Fig. 1.** Match a word functionality in game

The main features of the game are the dictionary and the levelling system. The dictionary contains all of the language words used in the application and their English translations. Further information can be discovered about each word, such as the words definition and an audio example of the pronunciation. The application is broken into 34 levels, with each 5<sup>th</sup> level a revision level. In order to 'Level Up' the user must achieve 100% on the match-a-word game using the level specific words. As the user progresses through the levels they will acquire badges to emphasise certain achievements.

## 2 Methods

Information from interviews with the participants was used to create two paper prototypes which were then evaluated by the group. After analysis of the playtesting with the paper prototypes, a high fidelity version of the game was created and tested by the group. The final product developed was a small android game, which taught users a few words at a time and re-enforced this knowledge with a word-match game. Once a black and white storyboard showing potential functionality was approved then two paper prototypes were developed and then presented to the group. The best aspects of each paper prototype were combined in a final version of the game.

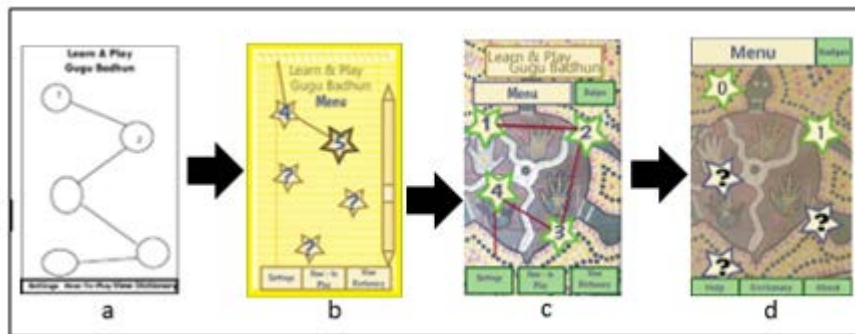


Fig. 2. Development process from sketches through high fidelity application

## 3 Findings

The participants were particularly concerned that the game not be tokenistic or contribute to further misunderstanding about their culture. Through the use of co-design methods such as sketching, paper prototypes and short iteration cycles the researchers were able to focus on aspects of the game that were of the most interest to the participant. One of the primary outcomes of the research (other than the creation of the game) was a kindling of interest in the community to develop further games which might be of a more immersive aspect. A further outcome was the realization that making the game available via Google Store or other public mechanisms might restrict the group's ability to control who has access to the intellectual property embodied in the game. To this end the group decided to make the game only available by USB installation.

## 4 Conclusion

Digital games, like all other technology objects reflect the culture of their creators. Salen and Zimmerman [8] emphasize that “games are culture...The Sims is not merely a simulation of suburbia, but a representation of cultural interaction that relies on an ideological reality located beyond the scope of actual game play” (p. 507). By involving a group in the design of a game that reflects their culture, we help ensure that the underlying norms of that culture are embodied within it [9]. Co-making a game with a cultural focus, i.e. a game that focuses on the culture of a given group avoids the problem of stereotypical representation in the larger non-indigenous society. Indeed, Shaw suggests that while complete non-representation in the video game market is better than stereotypical representation this lack of presence leads to the increasing invisibility and lack of voice in the wider gaming community [9]. Facilitating Indigenous partners to create games that reflect their own culture, gives them increased “voice” and presence in the dominating culture.

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