# Bunji

## An AR tour of Melbourne's cultural heritage

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## Introduction

From its Indigenous roots in the Kulin Nation, to European colonisation, to today's sprawling, multicultural city, Naarm (or Melbourne) is a place like no other. Its tragic history sets it apart from other cities globally, and barely fifty years on from the end of the Stolen Generation, Melbourne has a long way to go. The trauma caused by forced separation between children and their families is still felt by Indigenous Australians today (Nogrady, 2019). Only through reconciliation, thorough and thoughtful education, and collaboration between settlers and Indigenous Australians can Melbourne grow beyond its colonial past and build a new, inclusive and harmonious future.

#### Augmented reality and immersion

Augmented reality (AR) is the integration of digital media with our environments, with a screen overlaying information on a real environment. AR is predominantly used for entertainment purposes with *Pokémon Go* (Mulkerin, 2016; Niantic, 2016), *Monster Hunter Now* (Niantic, 2023) and *Snapchat* (Snap, 2011). Troy Innocent (2021) released *64 Ways of Being,* an AR game specific to the streets of Melbourne, encouraging exploration and play in its users while quietly educating them about the city, a testament to the educational capabilities of AR (Figure 1).



Figure 1. 64 Ways of Being integrated AR games right into Melbourne's CBD.

## What is Bunji?

*Bunji* is an interactive AR smart device app, an educational guided tour through Melbourne's CBD and surrounding areas. Partnering with VicScreen and the Koorie Heritage Trust, *Bunji* assists Melbourne's youth in understanding the CBD, and how they could shape the city's future. Targeting secondary school students, *Bunji* is an opportunity for young people to learn about Melbourne's Indigenous and colonial history at their own pace, and to explore the relevance of Melbourne's past to their own lives. It is designed with the intention that secondary schools may choose to integrate it into their lesson plans with an educational trip to the city.

#### Application structure and narrative

The app follows Bunji, an emu, as she searches for her family. Users must assist her by pursuing clues across the CBD and discovering hints at historically significant monuments or structures. Users may be able to locate clues of her family's location by panning their handset across a landmark - an eggshell buried on the top of Flinders Street Station, a feather on the Fitzroy Gardens Scar Tree, or footprints in Federation Square. Small quantities of information will also surface on the device screen, such as notable dates, people and events from the past.

Working in groups or alone, students will follow the emu's directions to the next landmark, the next place to search for her family (for example, 'turn right at the bronze statue of a dog'). Like a scavenger hunt, *Bunji* supports enquiry-based learning. By asking and seeking answers to their own questions at their own pace, students will feel rewarded and motivated (Dodge, 1991; Gaskill et al., 2006).

Users of *Bunji* will be able to view a glimpse of the past with their device, viewing a landmark as it is and as it was. Each hunt will be different, with Bunji's family found in a new location each time users play. To ensure the correct perspective, they will be

guided by marks on the ground, inviting them to stand in a particular spot, point their device at the landmark, and view a seamless snapshot, the past and present combined (Figure 2).



Figure 2. With Bunji, users will be able to see the past and present at the same time.

#### AR Games, interactivity and motivation

There is a wealth of literature praising AR games for their educational benefits. AR gaming is proven to be highly engaging, enjoyable and innovative and the idea of escapism is at the core of the appeal (Shin, 2019). Mobile AR games are also shown to improve students' motivation to collaborate with their peers (Geroimenko, 2020), learning attitudes and a sense of relevance of their studies to their lives (Jerry & Aaron, 2010).

Consequently, *Bunji* will also encourage students to envision their own future for the city. Taking inspiration from creative non-AR games like *Picrew* (Tetrachroma, 2017; Figure 3) and *The Sims* (EA, 2000), and AR technology used by *Snapchat* (Snap, 2011) and *Instagram* (Meta, 2010), users will be able to edit a landmark in real time with a collection of predesigned assets. Students will choose from categories such as

'Steampunk', 'Green Futures', 'Industrial' and various architectural styles, adding new elements to established buildings. Many of these assets will be designed via collaboration with Naarm-based Indigenous artists, further cementing the place of Aboriginal cultures in Melbourne's future.



Figure 3. Like Tetrachroma's Picrew, Bunji forefronts creativity without complicating the user interface, allowing thousands of unique combinations and designs.

Bunji's AR-integration allows students to create infinite futures by allowing them to view their designs from different angles while on location. This contextualizes their vision and encourages them to consider their impact on Melbourne. Each new design is entered into the yearly 'Best Future' competition, with the winner receiving an educational gift card and the opportunity to project their design onto a landmark via a transparency screen. *Bunji*'s interactive, gamified elements set it apart from other educational city exploration applications. It invites users to develop their critical thinking skills through creativity, and allowing students to grow into well-rounded and considerate young adults with an understanding of their role in the future (Kingsley et al., 2015).

## Audience

*Bunji*'s mission is to introduce all Victorian secondary school students to Melbourne's past, present, and future. It allows all students to learn about the city's history and for young Indigenous Australians to interact with their legacy, with an emphasis on creativity and critical historical engagement. It is an interesting and engaging avenue for teaching Australian kids about the complicated and crucial interweave between Aboriginal heritage and Melbourne's history.

#### Indigenous engagement and empowerment

As of 2023, there are 450,000 secondary school students in Victoria (Victorian Government, 2023), and roughly 2% of students in the state are of Aboriginal or Torres Strait Islander descent (ABS, 2023).

Cultural and historical education is hugely beneficial for all students (Burridge et al., 2021), with Indigenous students able to connect with their heritage, and non-Indigenous students able to build their understanding and empathy of Indigenous issues. In response to failure of Indigenous students by the Australian educational system, Lowe and Weuffen (2023, p. 23) found that 'a sense of connection associated with their Aboriginal identity drove [students] purposively and actively to resist colonial process of assimilation and elimination', only highlighting the significance of education to maintaining cultural identity and integrity. Studies have revealed a significant lack of Aboriginal teachers or appropriate Aboriginal study materials available to students (Korff, 2021), poor representation in textbooks and inadequate teachers, leading to an ill-motivated cohort of Indigenous students, as well as poorer attendance (NIAA, 2021).

It is critical that young people are taught about Australia's perilous colonial history and inspired to make a difference in Australia's future, and it is important that Indigenous students, especially, are not disenfranchised or undereducated about their cultural heritage. *Bunji* will work with Indigenous artists and historians to increase students' awareness and respect of Indigenous cultures while also increasing attendance and school retention rates.

#### Gamifying education

*Bunji's* primary audience is teenagers, and research has shown repeatedly that teenagers love video games and respond well to games in educational contexts. One study revealed that 95.8% of students looked forward to playing games in a classroom setting (Kingsley et al., 2015), while another showed the very positive psychological and behavioural outcomes of gamification (Hamari et al., 2014).

Through AR, *Bunji* is able to construct and showcase the rich tapestry of Aboriginal connection to the land in an interactive fashion to increase engagement and interest with younger audiences (Gordillo et al., 2013). This gamification fosters an experience where users become active participants in Australia's past and future and the interactivity will allow users to overcome the widely passive absorption of information generally seen in educational institutions. To allow a stronger connection, particularly with younger audiences, this project will utilise AR to surpass current pedological education methods.

Facilitation from teachers further enables students to learn from the gamified experience (Jerry & Aaron, 2010). Therefore, it is important that *Bunji* is well-integrated within schools, with students discussing, questioning and examining their experience with the app once they return to the classroom, establishing the relevance of the app and encouraging thoughtful engagement with the past, the future and Indigenous culture.

## Region

*Bunji's* first launch will take place within Melbourne' CBD, home to historically significant landmarks such the Royal Botanic Gardens, once a Boonwurrung gathering place, or the Melbourne Town Hall. Throughout the nineteenth century, the colony underwent significant changes that led to its development as an important hub for commerce during the last few centuries (Culture Heritage Centre for Asia and the Pacific, 2001).

Today, the city's complex history and thoughtful urban planning position it as an excellent environment for students to actively learn about history and take control of their future. Learning at the physical locations where historical events transpired might engender a more profound comprehension of the context and consequentiality of these events, cultivating a feeling of belonging and encouraging active participation in civic affairs (Gruenewald & Smith, 2014).

## Accessibility, safety and limitations

*Bunji* has a preference for visual information instead of auditory information. However, an enhanced and descriptive audio narration will be provided to accommodate visually-impaired users. In order for AR applications to be effective and practical, they need to be designed with simplicity and ease-of-use in mind, and users need access to a continuous Wi-Fi connection (Han et al., 2018), GPS technology, speakers, and an intuitive user interface (Bower et al., 2014).

Influenced by AR applications and games that are already popular with students, *Bunji* is designed to be simple to use, with broad compatibility in mind, working on most smart devices released in the last five years to avoid excluding students without access to the most modern technology. Melbourne CBD's free wi-fi network means that users with access to a smart device should have little difficulty engaging with the app. In addition, the use of AR offers access to experiences and resources that would otherwise be too expensive or impractical (Bower et al., 2014).

However, AR has its limitations. Users may find it difficult to fully engage on a small, handheld screen, to use the app with one hand or even to split their attention between the app and the real world (Papagiannaki et al., 2018). For this reason, and for general safety around the city, users are encouraged to use the app in groups, with or without a teacher present, depending on age and level of maturity.

## Resources

#### Industry partners

#### VicScreen

The major industry partner for *Bunji* is VicScreen, the Victorian Government's creative screen development agency. For over 25 years, VicScreen has supported Victorian game developers in their efforts to push boundaries and produce some of the most thrilling and well-known titles in Australia's gaming industry, attracting capital and tourism, and enhancing Australian culture.

#### Koorie Heritage Trust

The Koorie Heritage Trust, a Melbourne-based non-profit organization, was established in 1985 to protect and promote the indigenous culture of the region's indigenous peoples. It holds the only public collection in Victoria dedicated exclusively to Koorie art and culture, showcasing Victorian First Peoples art and design. The trust offers guided walking tours and information about pathways users can take while playing Bunji, providing valuable historical backgrounds and cultural experiences.

#### Funding and timeline

VicScreen provides funding up to \$500,000 for game development for PC, consoles, mobile devices, VR and AR, and offers resources necessary for pre-production, production, and post-production stage.

As per EB Pearls (2023), it can take more than 1600 hours for the development of a hybrid game application. This does not include the hours involved in the mapping and story developing process which can push that number to over 2000 hours. According to EB Pearls (2023), game apps generally cost between \$90,000 and \$350,000,

depending on features. It is estimated that *Bunji* will cost approximately \$250,000 to build and maintain for two years, meaning that VicScreen may be able to fund all or most of the project, a valuable investment into Victorian education.

The app will be developed from December 2023 to August 2024, tested from September 2024 to January 2025, and ready for launch at the beginning of the 2025 school year. It will initially remain available for two years to determine its level of success, with potential to be integrated into the school system indefinitely.

#### Benchmarks for success

#### Quality assurance and user satisfaction

User satisfaction is a gauge of how well the application satisfies users' requirements, lives up to their expectations, and offers a smooth and pleasurable user experience. App Store and Play Store ratings is a comprehensive metric that takes into account user feedback, customer support, design, and performance. They influence the app's visibility, user retention, and general reputation, all of which have a direct impact on its success. Adebayo (2019) mentions that one of the benchmarks for success is to achieve a latency below the minimum recommended value of 20 ms required for a smooth cloud experience. Prior to launch, rigorous testing will take place to ensure users have a positive experience. For a game application like *Bunji*, App Store and Google Play Store ratings can be utilized to evaluate user satisfaction and effectiveness of quality assurance tests.

#### School integration

Integrating *Bunji* into the curriculum guarantees that it is relevant and increases its popularity and credibility with teachers, students, and parents. The app may significantly enhance students' learning outcomes and academic success by becoming a vital part of their educational journey, establishing a standard for its effectiveness in the educational

technology market. *Bunji* should be integrated into 100 schools by the end of the initial launch two-year period to be deemed successful.

#### Distribution

*Bunji* will be published in flagship mobile app stores such as Apple's App Store and Google's Play Store for the iOS and Android operating systems, focusing on hardware released within the last five years. The initial launch period will support the app for two years, and depending on levels of success, the app's lifespan could be indefinite. Future distribution plans might include porting the game to other platforms such as the Microsoft Store for the Surface Pro tablet family and distributing the program across other cities.

## Visual development

#### Inspiration

*Bunji* is inspired by mobile games that encourage exploration which mainly uses AR technologies as its main mechanic. Inspirations for *Bunji* include existing AR-based mobile games, which influenced not only the gameplay structure but also the user interface, settings, and navigation systems. *Bunji* aims to leverage these aspects, combining education and entertainment.

#### Mockup designs

With *Bunji*, users can integrate the past into the present, simply swiping down on a landmark to see how it once looked (Figure 4). By viewing both time periods at the same time, users can contextualise history and begin to think about how the landmark will change in the future.



Figure 4. Seeing the past is as simple as swiping.

As users explore more of the city, visited landmarks will begin to appear on the application's map, making it easier to revisit sites and revise information (Figure 5). Users can also use the app's AR-integrated camera to see landmarks marked ahead (Figure 6) and visualise their own version of Melbourne in the future (Figure 8). *Bunji's* logo is a simplified emu footprint, a reference to the app's emu mascot (Figure 7).



Figure 5. Once users discover a site for the first time, they can quickly find them again using the map.Bunji's map will allow students to revisit sites after finding them.





Figure 6. Bunji's camera can remind users which landmarks are ahead, helping to orient them.







Figure 8. Bunji offers students a chance to visualise their own future.

## Bunji's future

Aiming to educate students about the past and to empower them to take the future into their own hands, *Bunji* has great potential for success within Melbourne's CBD. It will encourage learning through play, motivating students to develop skills in teamwork and creativity while equipping them with the knowledge and abilities to become a valuable participant in society as they grow older.

The app also holds the capacity for expansion into areas outside the CBD, and perhaps outside Victoria, that are equally rich in educational benefits. Following success within Victoria's schools, *Bunji* could develop branches in other cities, allowing interstate students to explore and build upon their own histories.

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