

## **Kaimanāki o te Ngahere: Guardians of the Forest**

Allan Fowler, Tanya Ruka, Michaela Dodd, Bai Xue & Mark Harvey

International Conference on Entertainment Computing

### **Abstract**

Inspiring children to appreciate and safeguard endemic species is crucial. Embodied learning experiences enhance their connection with nature, increasing empathy and environmental awareness. However, urban sprawl has reduced opportunities for meaningful engagement with natural environments. Kaimanaki o te Ngahere: Guardians of the Forest is a narrative-driven educational game designed to reconnect children aged five-to-eight with Aotearoa's native ecosystems. The game introduces Mori concepts of kaitiakitanga, mramatanga, and whanaungatanga to encourage reciprocal care between players and the forest. It aims to raise awareness of Myrtle Rust affecting native trees like phutukawa, mnuka, knuka, rt, and ramarama. Recognising that traditional environmental education may not resonate with young learners, we use prkau (storytelling) to frame the gameplay experience. Prkau fosters deep relational learning, shaping the player's journey as they navigate environmental challenges through interactive storytelling.

Future development will introduce Augmented Reality (AR) to connect digital storytelling with real-world conservation efforts, deepening ecological learning.

### **1 Introduction**

The importance of inspiring children to appreciate and safeguard endemic species cannot be ignored. Embodied [5] learning experiences enhance children's connection with nature, increasing their empathy and awareness of environmental issues [1,2,3,4]. However, urban sprawl and high-density housing have significantly reduced opportunities for children to engage meaningfully with natural environments [6, 7]. Kaimanaki o te Ngahere: Guardians of the Forest is a narrative-driven educational game designed to reconnect children aged 5–8 with Aotearoa's native ecosystems. The game introduces Mori concepts of kaitiakitanga (stewardship), mramatanga (learning through practice), and whanaungatanga (building and maintaining relationships) to encourage reciprocal care between players and the forest. The narrative aims to increase awareness of the impact of Myrtle Rust [8] on our native trees. Myrtle Rust (*Austropuccinia psidii*) is a pathogen that impacts native species such as phutukawa, mnuka, knuka, rt, and ramarama [9].

Recognizing that traditional forms of environmental education may not always resonate with young learners, we incorporate prkau (storytelling) [14] as a methodological approach to frame the gameplay experience. Prkau, a Mori way of transmitting knowledge through narrative, fosters deep relational learning. As Smith, et al. [13]

argue, indigenous storywork decolonizes research by embedding knowledge within culturally relevant storytelling practices. In this game, prkau shapes the player's journey as they learn to navigate environmental challenges through interactive storytelling.

Storytelling has always been central to indigenous knowledge systems, shaping the way people understand their relationships with the environment [13]. Rather than presenting information as static facts, prkau weaves together experiential learning, relational ethics, and cultural values. Within Kaimanaki o te Ngahere, the game narrative positions the player as a kaitiaki (guardian) tasked with caring for the ngahere (forest). The player embodies Mokopirirakau, an avatar inspired by the Tautuku gecko (Mokopirirakau. galaxias), a gecko native to Aotearoa, who journeys through different forest ecosystems facing the challenge of myrtle rust (*Austropuccinia.psidii*).

By taking on the role of kaitiaki, the player engages in transformational play, a concept described by Barab et al. [5] as the process of adopting a protagonist role to solve real-world problems in a fictional space. The game does not merely simulate conservation efforts but rather immerses the player in a reciprocal relationship with the forest. This approach aligns with Mori epistemologies, where knowledge is inseparable from relationships both human and more-than-human and is nurtured through practices such as karakia, which honour the mauri of the environment and guide care for the whenua [12].

## **2 Kaimanaki o te Ngahere: Guardians of the Forest**

Kaimanaki o te Ngahere is designed as a narrative-driven, educational experience that immerses players in the sights and sounds of a New Zealand forest. Inspired by games like Paper Mario [10] and Born of Bread [11], the game integrates soft color palettes, rich soundscapes of native bird calls, and intuitive mechanics to create an engaging experience.

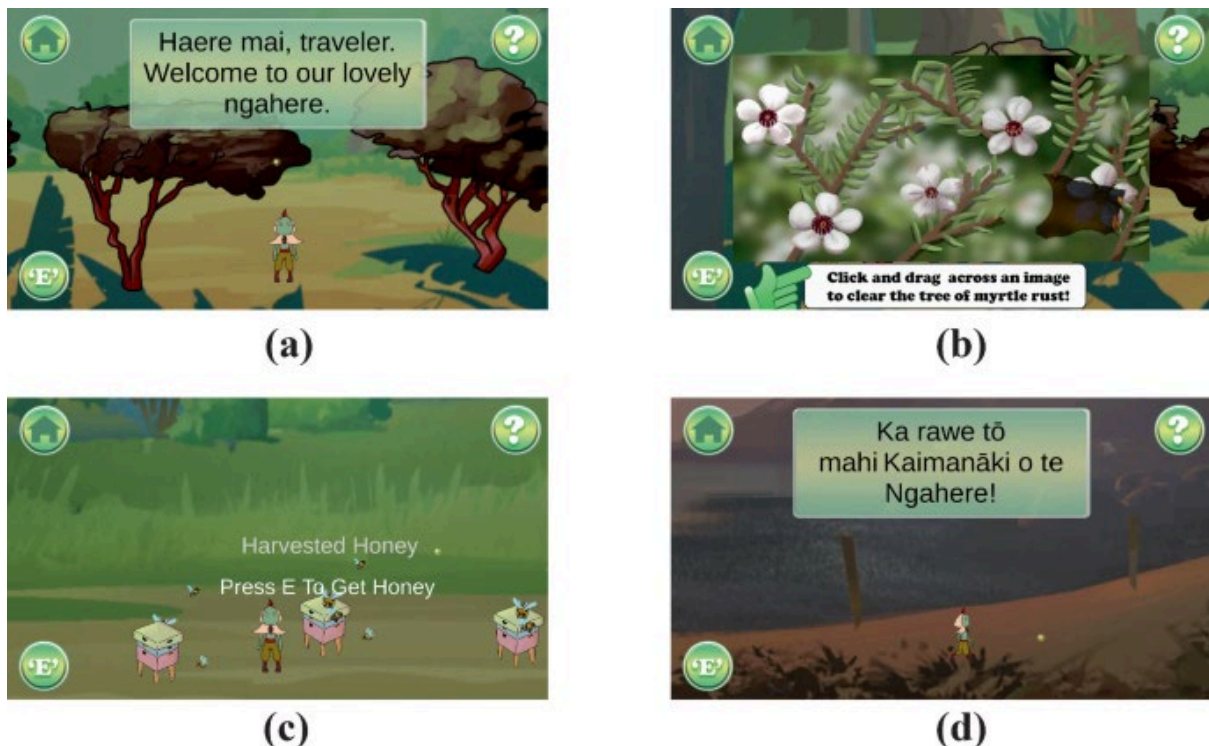
### **2.1 Gameplay Overview**

- Level 1: The player learns to identify manuka trees affected by myrtle rust and uses traditional interventions to help restore them, rebalancing the ecosystem (Figs. 1A-1B).
- Level 2: The player moves through the forest, tending to pohutukawa trees and learning how the pathogen spreads.
- Level 3: The player gathers natural resources, such as manuka honey and kawakawa leaves, to create a restorative tea, reinforcing interdependence with the ecosystem (Fig. 1C).
- Level 4 The player continues to move through the forest tending to ramarama trees learning how the pathogen spreads.

- Final Level: The player is guided by a Kaitiaki (guardian spirit) and hears the voice of the wairua (spirit) of the forest, learning that they are now a Kaimanakia true guardian of the ngahere (Fig. 1D).

The game was developed using Unity, with a focus on culturally responsive design. By embedding mātāuranga Māori into both the mechanics and narrative, the game provides an interactive storytelling experience that fosters deeper environmental awareness in young players.

**Fig. 1.**



### 3 Conclusion and Future Work

While the game currently provides an engaging digital experience, the next development phase will introduce Augmented Reality (AR) to further connect digital storytelling with real-world conservation efforts. The AR component will enable players to identify actual trees affected by myrtle rust and explore alternative interventions, deepening their ecological learning. By blending prkai methodology, mātāuranga Māori, and interactive digital media, Kaimanaki o te Ngahere represents a transdisciplinary approach to indigenous-led game design. Future iterations will expand on the ways of indigenous storytelling can shape transformative environmental education, fostering the next generation of kaitiaki for Aotearoa's forests.

### References

1. Beery, T., Chawla, L., Levin, P.: Being and becoming in nature: defining and measuring connection to nature in young children. *Int. J. Early Childhood Environ. Educ.* **7**(3), 3–22 (2020)
2. Cumbo, B. J., Paay, J., Kjeldskov, J., Jacobs, B. C.: Connecting children to nature with technology: sowing the seeds for proenvironmental behaviour. In: *Proceedings of the 2014 conference on Interaction design and children*, pp. 189–192 (2014)
3. Barab, S.A., Gresalfi, M., Ingram-Goble, A.: Transformational play: using games to position person, content, and context. *Educ. Res.* **39**(7), 525–536 (2010)
4. Barab, S.A., Luehmann, A. L.: Building sustainable science curriculum: Acknowledging and accommodating local adaptation. *Sci. Educ.* **87**(4), 454–467 (2003)
5. Barab, S., et al.: Situationally embodied curriculum: relating formalisms and contexts. *Sci. Educ.* **91**(5), 750–782 (2007)
6. Bailie, P. E.: *Connecting children to nature: a multiple case study of nature center preschools*. The University of Nebraska-Lincoln (2012)
7. Moore, R. C.: The need for nature: a childhood right. *Social Justice*, 24(3 (69)), pp. 203–220 (1997)
8. Toome-Heller, M., et al.: Chasing myrtle rust in New Zealand: host range and distribution over the first year after invasion. *Australas. Plant Pathol.* **49**, 221–230 (2020)
9. Teulon, D.A.J., et al.: The threat of myrtle rust to Maori taonga plant species in New Zealand. *NZ Plant Prot.* **68**, 66–75 (2015)
10. Paper Mario, <https://www.nintendo.com/us/store/products/paper-mario-the-thousand-year-door-switch/>. Last Accessed 14 Feb 2025
11. Born of Bread. <https://www.wildartsgames.com/bornofbread>. Last Accessed 14 Feb 2025
12. Southey, K. M.: *Re-presenting mori and indigenous understandings of being: Deconstructing the notion of mental illness* (Doctoral dissertation, The University of Waikato)(2020)
13. Smith, L. T.: *Decolonizing research: indigenous storywork as methodology*. Bloomsbury Publishing(2019)
14. Lee, J.: Decolonising Mori narratives: prkau as a method. *MAI review* **2**(3), 1–12 (2009)