

Embedding Computational Thinking into Authentic Technology Practice

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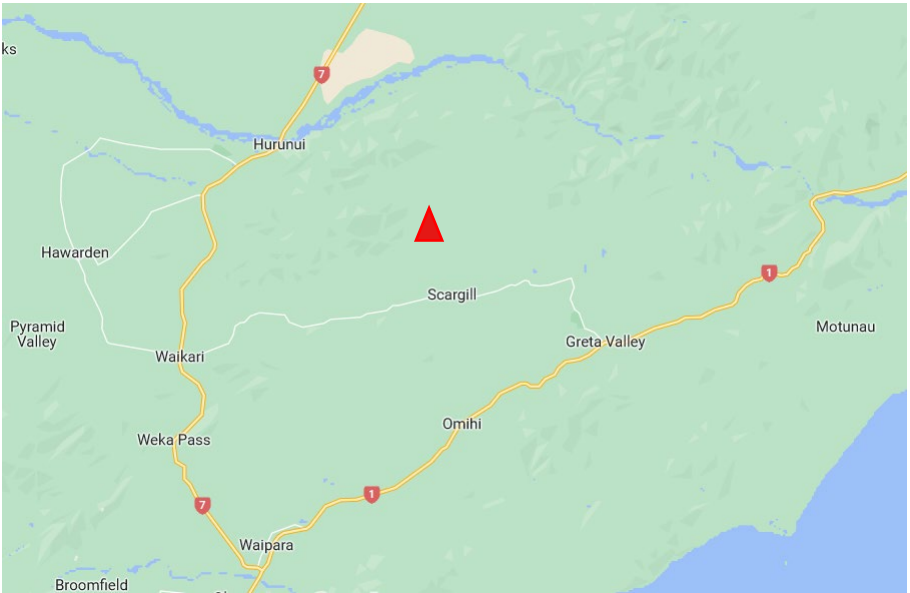
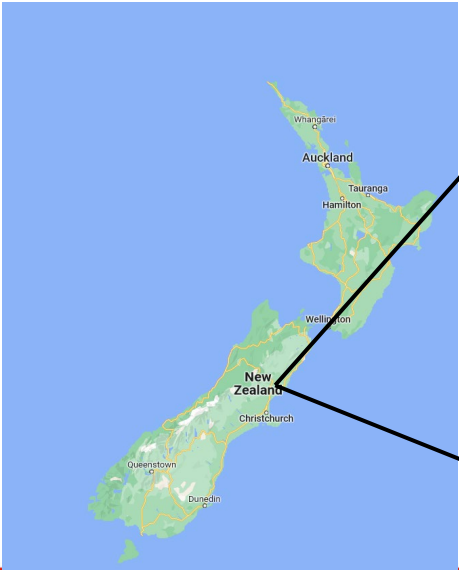
PATT40: The 40th International Pupils' Attitudes Towards Technology Research Conference

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TE KURA TOI TANGATA
FACULTY OF EDUCATION

WHERE THE WORLD IS GOING
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Pepeha



My Motivation



Co-researchers @ UoW

Dr Shaoqun Wu

Senior Lecturer, Department of Computer Science

Matthew Stafford

Final Year BTch Student and summer scholar 2022 and 2023

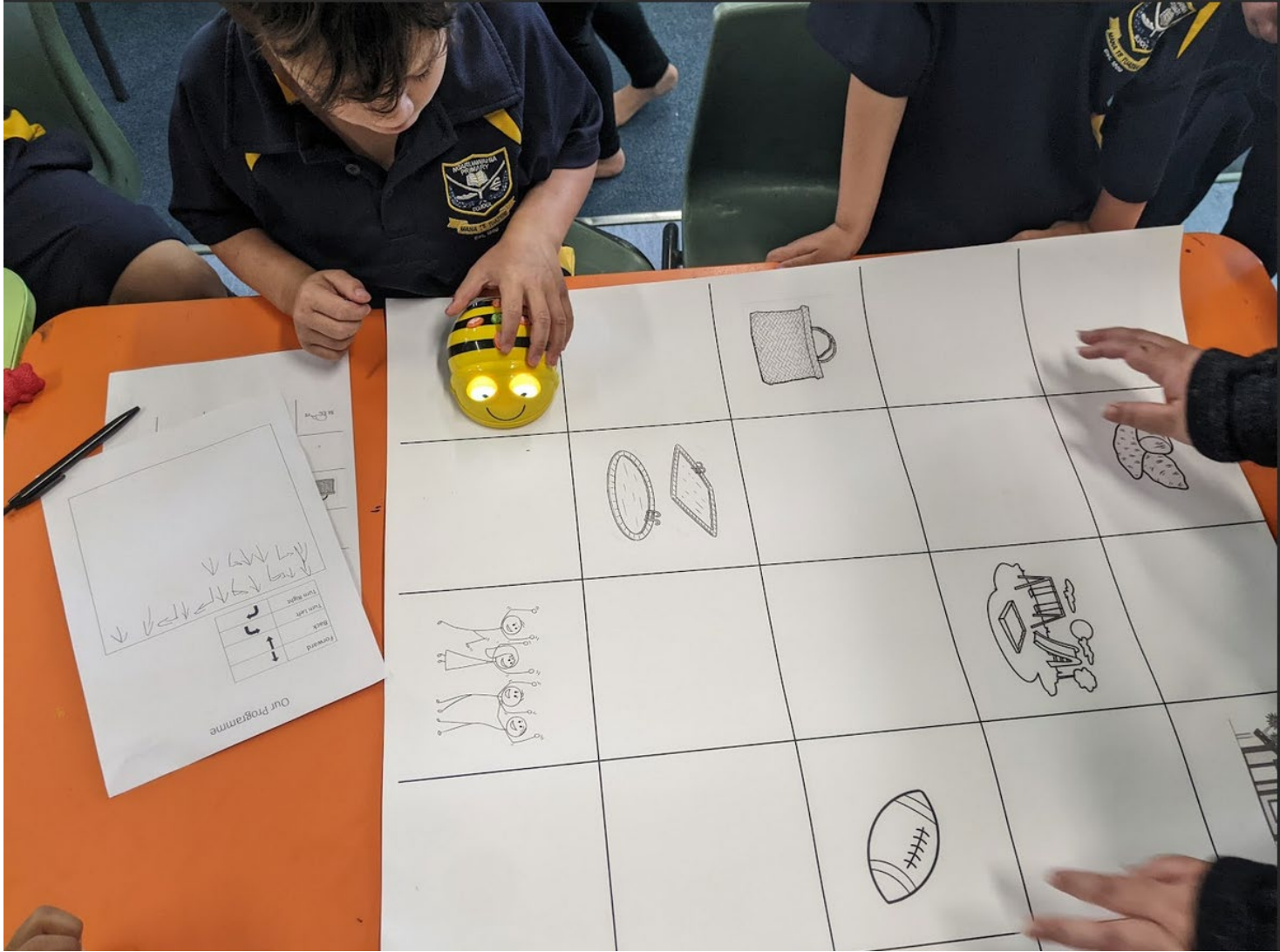
Tiana Mayo

Final Year BTch Student and summer scholar 2021 and 2022



Presentation Overview

- About the study
- Working with Māori learners and technology
- Methodology and Methods
- Findings
 - Culturally Informed Pedagogy
 - Student Engagement and Emerging Understanding of Computational Thinking and Coding
- Discussion
- Questions



whakapapa - sequence

whaketerenga - navigation.

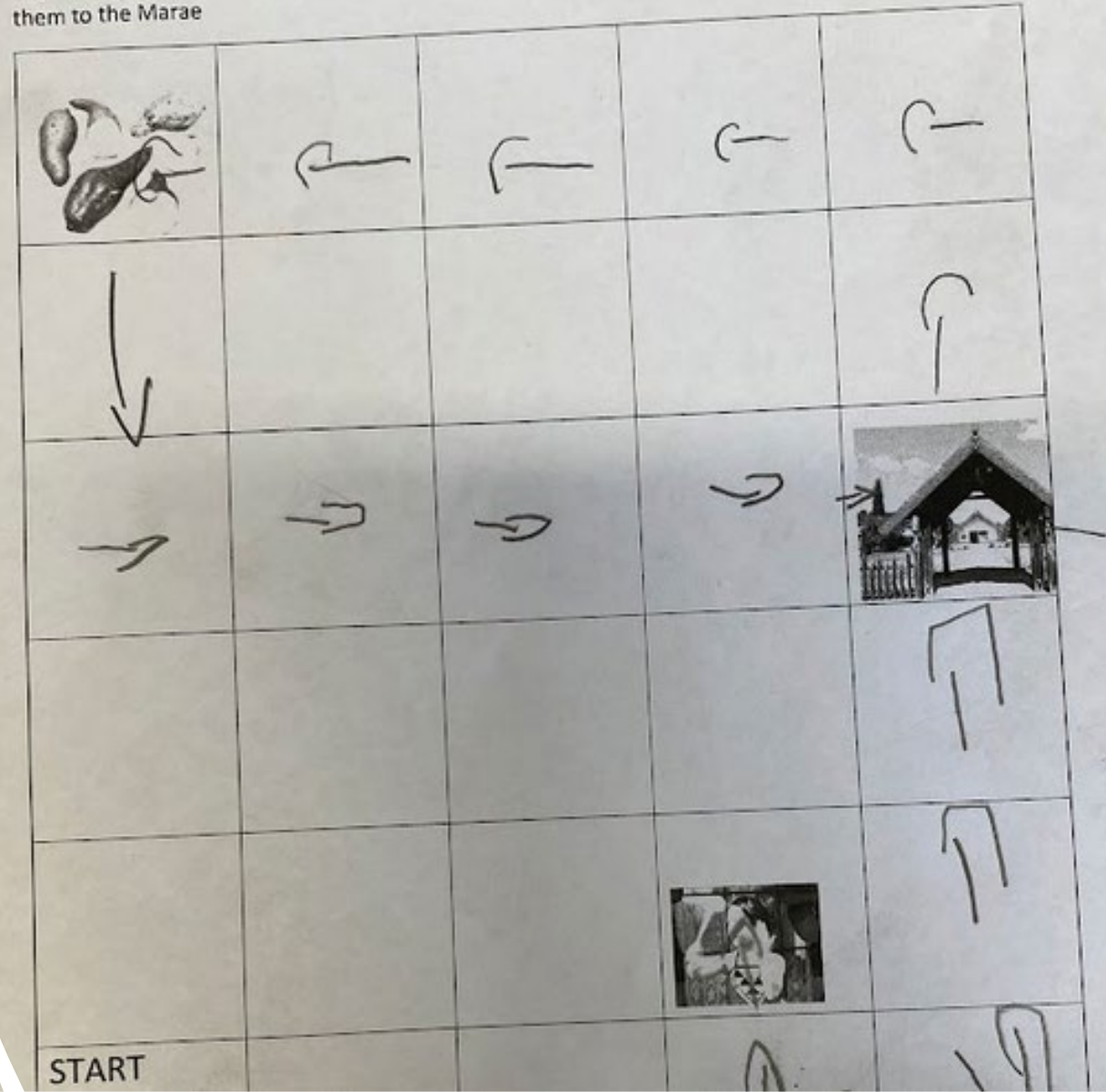
The Study

Research Question

- “How can teaching computational thinking and understanding of technology be enhanced by planning and implementing culturally authentic activities with young Māori learners?”

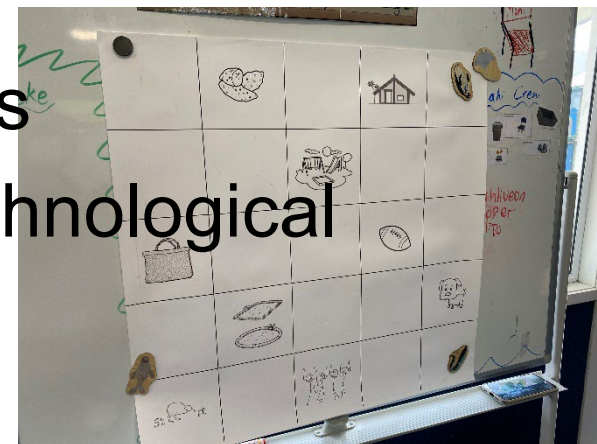
Programme the Robot to find the Marae

In groups of three write a programme for your robot to pick up your friend, then the kai and take them to the Marae



Working with Māori Learners

- Māori -see their cultural practices in the learning
- Kaupapa Māori (perceiving the world from a Māori perspective and normalising Māori values, behaviours, and understandings) -implementation of Māori processes and understandings within a Māori philosophical framework
- Culture -hook to engage underserved students to learn essential computational thinking skills is virtually unresearched
- Computational thinking in Kaupapa Māori,
 - little research on the development of Māori students
- Documented links between cultural identity and technological artefacts



Methodology and Methods

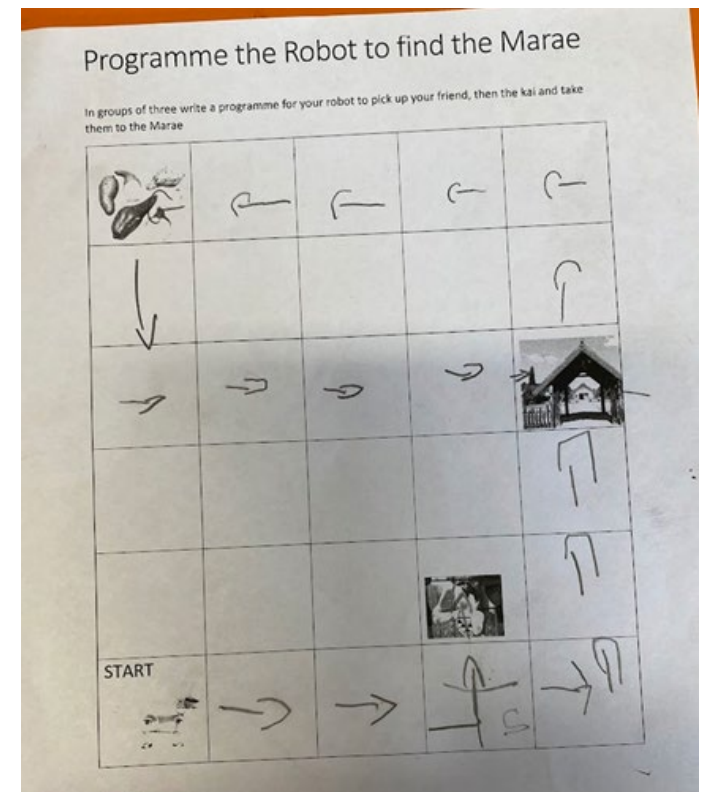
Māori students as developers and creators of technology and digital solutions.

- Qualitative methodology underpinned by theoretical concepts of Kaupapa Māori (Hoskins & Jones, 2017) and Constructionism (Papert & Harel, 1991)
- 12 students from Years 1-3 (5-7 years old) and their two teachers
- Guaranteed confidentiality; however, anonymity not guaranteed as
- Data methods included photos and videos of students in their school uniforms
- Other data

Findings:

- Culturally Informed Pedagogy

WM: WO and I were talking tonight, there's the disco and we have lots of new tamariki[children] who have come to our school and some of their whānau probably don't know where the hall is, they probably don't know where to park their car...they might get lost. We have lots of gates.

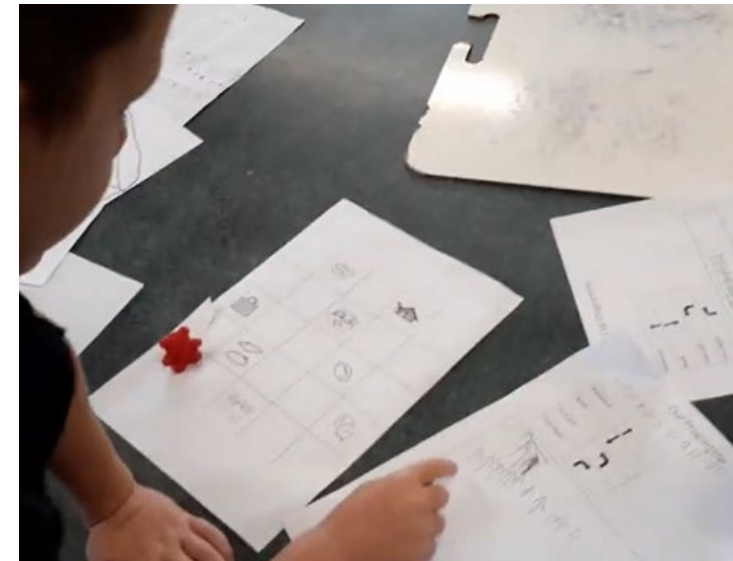


Findings:

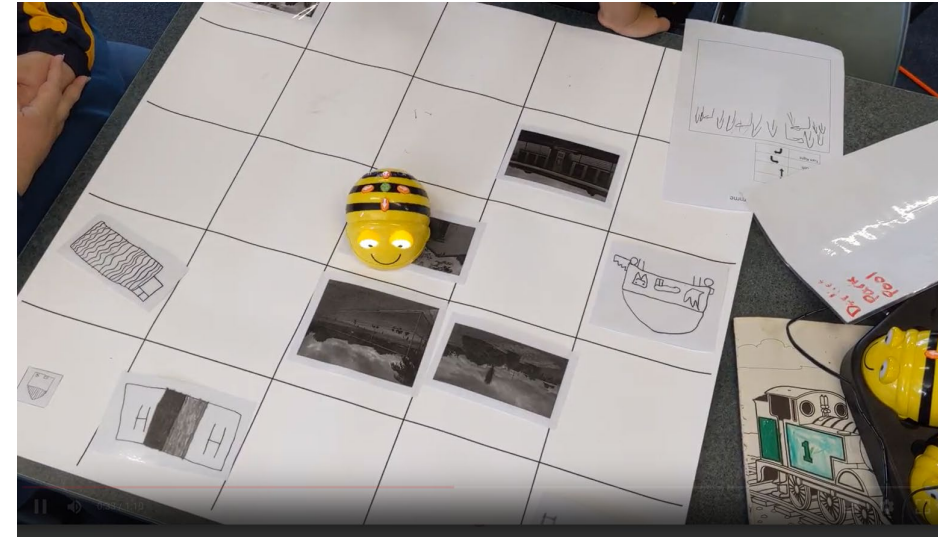
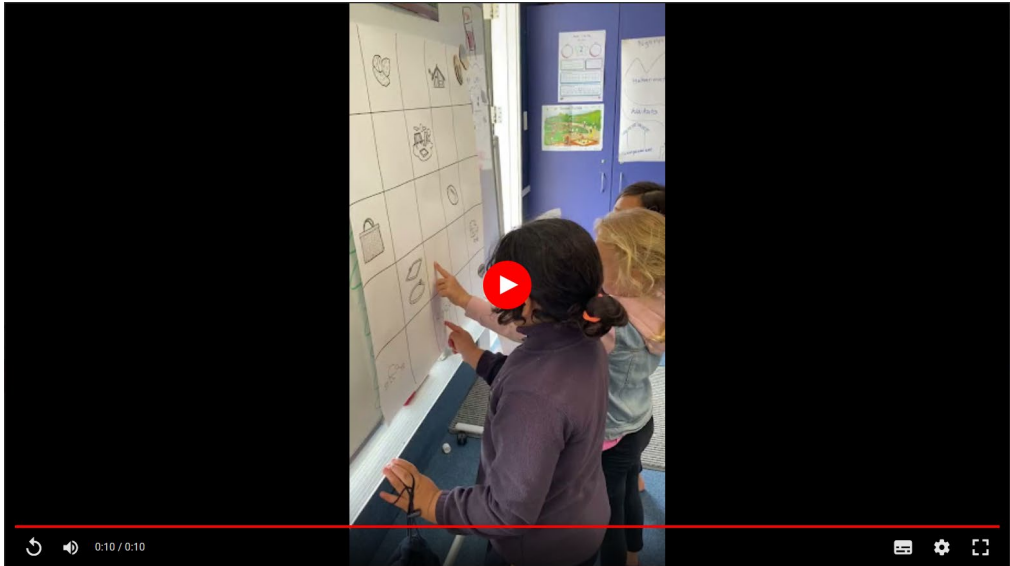
- Student Engagement and Emerging Understanding of Computational Thinking and Coding

All students understood the concept of programming a robot (Bee-Bot) by giving it multiple sequenced instructions.

The tuakana undertook self-correct debugging in relation to mapping a route. “After showing the kaiako his programme on paper, Ihaka entered his programme into the BeeBot and completed the task on his first attempt” [observation notes 24 November



Discussion



Tauira (students) in this study were predominantly Māori, a te Ao Māori perspective involved them interacting with content that was based on Māori values and beliefs, using Māori learning practices and engaging with te reo Māori.

The concepts of computation thinking were embedded in the students' cultural context in two ways

Conclusion

Modification to Brennan and Resnick's (2012) three-dimensional framework for Computational Thinking to

Three-dimensional framework for Computational Thinking with Authentic Cultural Contexts

- Computational concepts,
- Computational **and cultural** practices
- Computational **and cultural** perspectives.



Thank you for listening. Questions?