

# A MIXED METHODS ACTION RESEARCH PROJECT INVESTIGATING STEM TO STEAM USING THE APISCOPE AS A TOOL FOR DIFFERENTIATED TEACHING AND LEARNING

## The Apiscope Buzz — Project Aim

This Teaching and Learning Research Initiative project was a two-year exploratory study focusing on differentiating the curriculum in response to individual learner differences. The project was designed to explore learning and teaching of differentiated scientific content through observational processes and expressed through the creative arts in two intermediate school classrooms each with an observational beehive, or Apiscope.

### TLRI PRINCIPAL INVESTIGATORS:

Professor Tracy Riley  
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### LEAD TEACHERS:

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Avalon Intermediate

Jared Simons,  
Newlands Intermediate

### PROJECT DATES:

Started: January 2018  
Completed: December 2019



## Creative outcomes

[Avalon Intermediate School  
Album and project documentary](#)



Newlands Intermediate School  
Childrens' Books



## Our questions

- 1) How can teachers use an observational beehive to stimulate the design and implementation of differentiated teaching and learning?
- 2) Does differentiated teaching and learning with the Apiscope develop and enhance students' knowledge, skills and attitudes?
- 3) What is the relationship between differentiated STEAM teaching and learning, and changes in the knowledge, skills and attitudes of learners who may require learning support, including gifted and talented?

## What we learnt

We observed three distinct forms of classroom differentiation:

- 1) student-led differentiation;
- 2) teacher-led-differentiation; and
- 3) differentiation that arises when a responsive learning environment is created.

Content, processes and products of learning were differentiated through collaborative creation of books and music by students working with each other, artists, beekeepers and their teachers in authentic learning contexts.

Engagement in the production of authentic, creative products, that positioned art across the disciplines, meant we had to negotiate some complex issues, like assessment and teacher expertise. Students showed growth through engagement in differentiated learning opportunities well-matched with their own abilities and interests, identified using multiple methods.

Telling the story of bees with musical lyrics and children's literature and enriched with dance, photography, videography, illustration, singing and collaboration fed students' natural curiosity about their world. It also empowered them to explore ways they can change it for the better.

## Implications for practice

- Differentiating teaching and learning through STEAM requires critical consideration of the position of arts centrally within the curriculum.
- Teacher knowledge and understanding of differentiation principles and how these are applied in practice must be developed in order to see shifts from student-led and teacher-led differentiation to that which is much more rich as teaching and learning is developed in a responsive, authentic environment.
- Engagement with professional artists to create and support authentic learning environments is key to differentiation that is meaningful and well-matched to abilities and qualities.
- When working in partnership with creative practitioners, teachers need to be positioned to move across and between student-led and teacher-led differentiation, and empowered to lead and facilitate differentiation in authentic learning environments.
- When observational learning is focused on a living system maintained on a school grounds or in a classroom, like the Apiscope, there is a need for the development of resources and support for teaching and learning.

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- Avalon Intermediate School  
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Principal Arianna Te Whetu (Current)

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