

# LabTalk

THE PATELLA



Volume 63 Number 1 - 2019 The Secondary Science Journal of the Science Teachers' Association of Victoria Inc.



ABN 59 004 145 329  
Print Post No. 100004476  
ISSN 0159-2033

Advancing Science Education

# Building a Flourishing STEM Community

from Islands of Interest

Roxanne Summer and Fiona Gordon, Bialik College, Hawthorn

## About the authors

How are you breaking down the silos to create multidisciplinary and cross-curricular collaborations? What needs to be in place to support students' desire to explore? Bialik College K - 12 has been developing whole school STEM and entrepreneurial strategies that have seen the growth of immersive experiences, new middle school elective subjects, Makerspace, STEM Days, Parent Education and encouragement of girls to study in STEM fields. This session will explore a range of STEM success stories and snapshots for Primary and Middle School teachers and encourage entrepreneurial leadership.

**A**t Bialik College, we have built a whole school strategy to interweave entrepreneurial thinking into our curriculum. This involves students from K - 12 developing the skills and dispositions to: pitch a concept; establish a culture of collaboration and creativity; create a framework of design thinking and scale up.

We started like an atoll exploding out of the sea. Over 3 years, our whole-school STEM Committee has evolved from this phenomena into a flourishing archipelago through a distributed leadership process. It has been strategically blended with our long term partnership with Harvard Graduate School of Education, Project Zero through Cultures of Thinking (CoT) and even more recently through Participatory Creativity inquiry with Dr Edward Clapp.

In recognising there was a gap in our learning opportunities, Roxanne and Fiona led a small group of enthusiasts creating a hub of interest. From our positions as Head of Educational Resources and Director of Learning and Innovation, we had a shared vision to usher in 21st Century Learning. A year after we began, development of a STEM Committee became part of the College's strategic plan and then eventually a CoT Project Leader Role (STEM) was created. After a year's apprenticeship with Fiona, this leader took on the chair of the now flourishing STEM committee.

In 1982, Peters and Waterman offered the metaphor of 'Ready, Fire, Aim.' There is a tight cluster of change-savvy ideas embedded in the 'ready, fire, aim' wisdom according to change management leader, Michael Fullen. He suggests that we focus on priorities; attend to relationships; treat each innovation as a learning period and go lightly on judgment. So, at Bialik, we firstly ask are you ready? We fire away and then re-consider our aim. It's been a successful team approach.

This process is definitely replicable. Do you have the conditions for innovation in your setting? Entrepreneurs such as Nick Crocker in Melbourne, have offered similar advice in different words, "Get into the mindset of 'I don't need to wait.'" In schools, we pose that there are a series of conditions that are

required for innovation which can equally block these new learning opportunities. Many teachers and school leaders will consider that all the conditions need to be in place for the innovation to commence. The conditions we find essential in STEM decision making are:

- Space
- Time
- Budget
- Resources
- Mindset
- Know-how
- Staffing

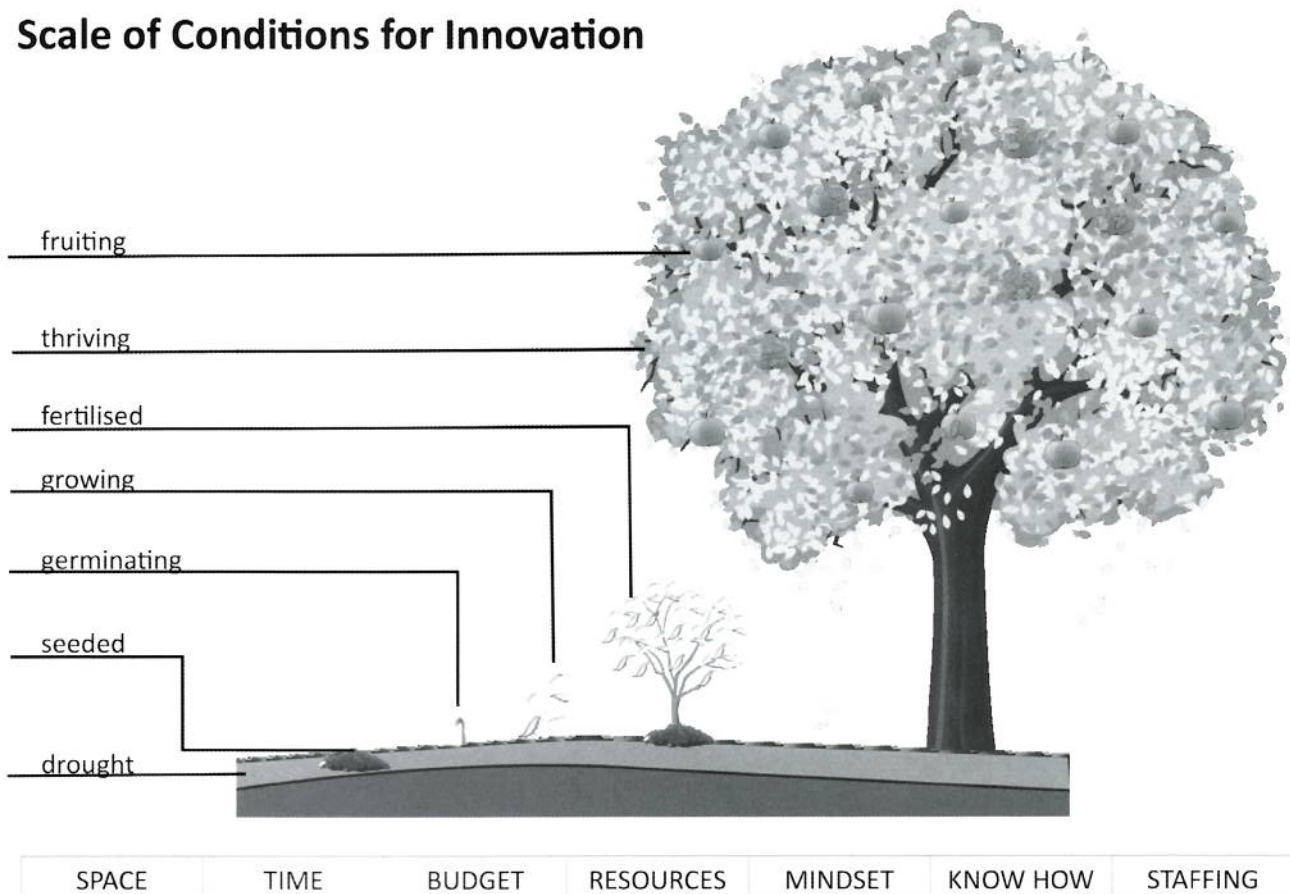
In many instances, these conditions cannot all be at the same level at the same time. We have developed a scale viewed through the 'ready fire aim' approach that used the metaphor of a flourishing tree. With seven stages for each condition, a quick evaluation can be made of where each condition sits on the scale (see Figure 1).

If you consider a recent STEM innovation you have led or been involved in, for each condition use the scale to position your environment. This will allow you to see which conditions are favouring your implementation and which may be impeding.

For example: think about the specific nature of the space you believe is required for your STEM innovation. Do you think you must have wet spaces? Or safe space for experimentation? Or connectivity for electronics? Do you need to set aside a place

Figure 1

## Scale of Conditions for Innovation



students can tinker in or space to leave projects in progress? If you used a traditional approach, you may seek this dedicated space from your leadership with all your specifications. However, if you fire and then aim, you could use a corridor space, a table outside, a temporary space, a corner of the classroom or even your colleagues' art space. Once the need is created then usually schools will see the benefit and support your innovation.

Another example may be with know-how, it is possible that you don't have expertise in Physics or coding or in the maker movement. In this case, it is possible to fire

before aiming by trusting in the resources readily available as kits or from online supportive communities. As you approach this not as an expert but as a learner along with your students, the innovation can be owned by all.

Of course, it could be any of the conditions that are not ideal for your innovation. It may seem that there are not enough staff. It may appear that there is no time. Or the budget may not be allocated. Just fire away. Any factor low on the scale can be lifted through collaborative and creative approaches. However, at Bialik College, we did not wait if

conditions were not all favourable, instead, we leveraged the top of the scale conditions as a starting point.

When considering the scope of your environment for STEM innovation, it's best initially, we found, to move at low tide. Look for situations where it is easy to walk across from one island or active STEM project to another. In this way, programs can be forged from single lessons, or an enthusiastic teacher or a series of unique experiences for students. Find the instances of imaginative teaching and STEM interest and connect these together rather than trying to build an entire program from nothing.

## Building a Flourishing STEM Community from Islands of Interest (continued)

Then you may be ready to swim from island to island. This means that more effort is required to make the connections between STEM initiatives. At this point, you may need to move some of your conditions up the scale. Perhaps meetings will need to be scheduled or specific resources might need to be purchased before the swim. A speaker might need to be engaged to alter mindset or staff may go to STEM PD and return with enthusiasm and know-how. Both the germinating and the growing stages in Figure 1 are key to this ability to develop further.

Next we believe that we have to create bridges between disciplines. In previous curriculum, each island was enough in itself. In the 21st Century, connection between disciplines is paramount. STEM by its very definition is the integration of Science, Technology, Engineering and Mathematics. Where once, schools taught these in isolation, the bridges between are now a key indicator of successful programs.

In our case study, Makerspace began from Roxanne bringing in a Makey Makey from home. She had learnt about it on the Internet. In sharing her enthusiasm in the library at lunchtime, students began to join in. With this small start, within a year, Makerspace had a dedicated space, a budget and a NAO Robot! Within two years, space had grown, attendance was across the Primary

and Middle School and our ELC was planning to introduce a Makerspace. By the third year, we employed a Makerspace Facilitator who was an engineer and teacher. This constant firing, re-aiming and readiness allowed us to develop Middle School STEM Days with vertical integration and industry experts facilitating the design process. The expectation was that all students throughout the day had access to our resourced and structured Makerspace.

Bridges have been built by engaging with Resource Rescue to spark creative use of resources to engender a focus on sustainability. Bridges have been built through including all Middle School teachers in this cross-curricular environment and as we have repeated these STEM Days our teachers have felt more able to participate and lead. Bridges have been built between Makerspace and the classrooms and we have far greater demand for integration of making into classroom units. In Fiona's strategy to structure the STEM Days to be our first vertical curriculum opportunity, Bialik is now positioned to break down further silos.

So, the next stages for Bialik are to include more projects. We want more islands, more bridges, more robust connections in our archipelago. We aim to lift each condition for innovation further up the scale. While we know that in some conditions we are still at the bottom of the scale as we

begin a new initiative, the success of the process we have already used empowers both of us and other teachers to fire away ;)

Please follow our progress [www.bialik.vic.edu.au](http://www.bialik.vic.edu.au) or contact us on Fiona Gordon [gordof@bialik.vic.edu.au](mailto:gordof@bialik.vic.edu.au) & Roxanne Summer [summer@bialik.vic.edu.au](mailto:summer@bialik.vic.edu.au) ■