

## **STEM Clubs: Piloting an Evaluation Framework**

### **A user guide for a quick 'health check'**

*An Inspiring Australia and University of Southern Queensland Collaboration*

#### Background

In brief, *Inspiring Australia (Queensland)* and a project team from the *University of Southern Queensland (USQ)* have been collaborating this year to consider what constitutes quality practice in STEM clubs. A number of outcomes will eventuate from this partnership. One of these is a framework that STEM club facilitators can use to consider their overarching club structures and areas of practice to identify where they have strengths/capacity and the areas that would benefit from further consideration and discussion.

#### Purpose

**The STEM club evaluation framework** is an important and timely resource for Queensland STEM clubs. It embraces the Inspiring STEM vision:

- A society that is inspired by and values scientific endeavour
- A society that attracts increasing national and international interest in its science
- A society that critically engages with key scientific issues
- A society that encourages young people to pursue scientific studies and career

To this end, existing research documenting quality practices in STEM clubs has been utilised to develop the framework. It has been built around a number of key concepts, which requires STEM facilitators to use understandings of their local club context to evaluate current structures and practices to inform future planning.

We are thinking of it like a 'health check' - an opportunity to consider where your STEM club is at in its development and implementation based on a number of quality criteria.

#### Your valued input and insights

At this stage, we are looking to pilot this framework with a range of STEM clubs across Queensland who are at various stages of development from inception to well established.

In being involved in this pilot, we will be asking the following three actions from you:

- Complete a 'health check' by responding to the framework based on where the STEM club is at now (e.g. not where you might like to be in the future);
- We are also piloting a couple of optional engagement questionnaires for club members and parents that we hope will provide a quick and easy way of indicating engagement and help you fill in some sections of the framework. We are interested to know if they are (i) a valid approach; (ii) useful to you; and (iii) can be improved if found useful.
- Participating in an interview to discuss your experience of using the framework, any issues you faced and any suggestions you have to improve the usability of this resource.

#### Some clarifications

Most aspects of this framework and how to use it are self-explanatory, but we would like to provide you with some of our own insights into the four criteria - *not applicable*, *planning*, *developing* and *in place* - we have developed to guide this 'health check'. This will assist you in responding in a way that best represents where your STEM club is at.

Criteria	Definition
<i>Not applicable</i>	it is not a relevant consideration for your STEM club.
<i>Planning</i>	suggests that you are considering this area, but it is not fully enacted yet
<i>Developing</i>	this area is part of your practice, but could be improved
<i>In place</i>	This area is embedded in your practice effectively

#### What happens next?

After you have completed a 'health check' of your STEM club, one of the USQ project team will be in touch to gauge your thoughts about the functionality of the framework as well as seek your suggestions for areas that could be improved. This will take place as a conversation on the phone or in-person at a time and place that suits you.

*Many thanks for your participation in this piloting process and we look forward to discussing your experience of using the STEM club evaluation framework in the near future.*

STEM CLUB EVALUATION FRAMEWORK		Not applicable	Planning	Developing	In place
Club management	<b>Vision</b>				
	Formulate and document a club vision that states a clear focus, philosophy, and is goal orientated				
	Initiate and sustain partnerships with STEM related institutions, organisations, and businesses, including other STEM clubs				
	<b>Partnerships</b>				
	Seek opportunities to access resources (for example infrastructure and in-kind contributions) and funding to support club sustainability (including grants, crowd funding, sponsorships and partnerships)				
	<b>Sustainability</b>				
	Establish club management structures that support forward and succession planning				
	Develop short and long-term budgets that take into account the size, activities, duration and location of the club's program				
	Ensure adequate staffing and volunteers are available, with staff and volunteers having relevant interest, skills and training				
	<b>Professional development</b>				
	Establish networks with other clubs and facilitators to support resource sharing and professional development				
	Undertake PD (including through free and low-cost options) related to club management, pedagogy and specialised knowledge and skills				
	<b>Safety</b>				
	Club adheres to any regulatory requirements for ensuring safety of all stakeholders (may include risk assessment, safety checklists, safety equipment, carer consent where required, equipment maintenance, working with children checks and so on)				
	<b>Communication</b>				
Communicate and inform members, families and community about club activities using multiple strategies such as social media, hashtags, and electronic newsletters ★					
Advertising and marketing the club in the local area					
Form networks with other STEM clubs and communicate regularly					
Environment	<b>Context</b>				
	Know and understand your context and members (including members' family needs and other commitments) and plan mindfully to ensure inclusive practice ★				
	Create a climate that fosters personal interest and enjoyment (informed by a range of evaluation strategies)				
	<b>Activities</b>				
	A balance of directed and student-centered learning activities that build on members' interests and includes opportunities for feedback and sharing				
	Hands on learning activities that promote tinkering, play, open ended exploration and where appropriate, competitions				
	Activities are planned, interconnected and purposeful ★				
	Activities are designed to foster curiosity and creative thinking ★				
	A mix of individual and group activities that foster social interaction and relationship building between learners ★				
	<b>Partnerships</b>				
	Incorporate community (including volunteers, families, industry experts and past members) involvement through guest speakers, facilitators, mentoring and co-learning with members				
	<b>Resources</b>				
	Optimise available space or seek alternative spaces to support learning and maximise member engagement				
Consider using a range of resources (including donated materials, open source resources, mobile technologies) and sources (partners, community, and funding agencies)					
Ensure resources, equipment and the procedures for their use are well planned, managed and maintained					
Evaluation	Incorporate a range of evaluation strategies designed to measure the success of the club against its vision and goals (could include member surveys, family surveys, school/organisation leadership surveys, volunteer experience surveys, critical reflection, observation, rate of participation)				
	Information gained through evaluation strategies is analysed and applied to inform decision making, planning and ongoing management of the club ★				
	Incorporate regular reviews of safety procedures, guidelines and expectations				

# STEM club engagement tools

A common feature of most STEM clubs is that they are an informal space for club members to come together and learn about science, technology, engineering, and mathematics. Their design acts as a contrast to curriculum based teaching in traditional spaces (e.g., classrooms and school laboratories).

Understanding the motivation and engagement of members and their parents is one of many indicators of STEM club success. The tools below are short easy to use instruments that can provide a quick “health check” on engagement through repeated use over time. They are intended as optional tools to help gather data that some STEM club practitioners may find useful, and support a wider framework of STEM club evaluation.






We suggest that these tools may assist you in establishing a better understanding to support the completion of the environment section of the STEM club evaluation framework.

# Resource to measure club member engagement

Tool to use at end of each session.

This tool may help you in understanding perceived engagement with the STEM club and its activities from members. Add up all the scores to get a score out of 25. Average these scores for all the participants and record them on a session-by-session basis. You may want to keep a record for each participant if they are regularly attending members to see if their engagement is increasing, constant, or decreasing.

Use the rubric below to identify opinions. The emoji may be useful for younger learners.

				
Not at all. (Score 1)	Not really. (Score 2)	Sometimes. (Score 3)	I agree! (Score 4)	Very! (Score 5)

The statements:

- 1) "This session was fun" (enjoyment of session)
- 2) "The session was interesting to me" (interest in session)
- 3) "I want to learn more about stuff we did today " (motivational orientation)
- 4) "People were friendly and nice to me" (the social experience)
- 5) "The STEM club leader made me feel welcome" (relationship with the facilitator(s))

A further statement that may be useful at end of term or holiday program is:

"I want to learn more about Science in my science classes at school"

## How was STEM club today?

We'd like to know how you feel about today's STEM club session. Please tick against the emoji that represents your feelings based on the statement above.

Club member name:

1) This session was fun



2) The session was interesting to me



3) I want to learn more about stuff we did today



4) People were friendly and nice to me



5) The STEM club leader made me feel welcome



## Alternative for younger members

This tool allows STEM club members to easily let a facilitator know about their engagement with a science class. This approach has some value as described at

<https://theconversation.com/why-i-use-emoji-in-research-and-teaching-75399>

Score extremely positive emoji 2 points , score positive emoji 1 point , score neutral/don't know emoji 0 points, score negative emoji -1 point, score extremely negative -2 points. This will give a score from 3 emoji and give a sense of how well activities are being received as well as areas that may be of concern e.g., feeling anxious or confused.

## How was STEM club today?

*We'd like to know how you feel about today's STEM club session. Please circle 3 emoji that most match how you felt about the club today.*

Club member name:



## Resource to measure parent engagement

This instrument may assist you in understanding parental engagement. Parental engagement is an important factor in the success of STEM club. Like other stakeholders, parental engagement with a STEM club requires motivation and commitment that sits alongside other competing factors e.g., work. You can use this tool to get a sense of parental engagement with a score out of 50. We would suggest that a score over 30 is a positive indicator.

Not at all true (Score 1)	A bit true (Score 2)	Somewhat true. (Score 3)	Mostly true (Score 4)	Completely true (Score 5)
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## Your feelings about STEM club.

We are interested in how you feel about STEM club and any observations you have made about your child. Please answer the questions below using this rubric.

Not at all true (Score 1)	A bit true (Score 2)	Somewhat true. (Score 3)	Mostly true (Score 4)	Completely true (Score 5)
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- 1) Science, Technology, Engineering and Mathematics (STEM) is interesting to me.
- 2) I believe my child is benefiting from being in the STEM club.
- 3) My child talks regularly to me about science.
- 4) I feel involved in STEM club activities.
- 5) Bringing my child to the STEM club is a chore (reverse score).
- 6) I have learned new things from this STEM club.
- 7) My child is excited about coming to the club.
- 8) Being knowledgeable about science is important.
- 9) In spite of other commitments, it's important to me to get my child to STEM Club each week.
- 10) I feel positive about STEM club.