GIPPYAg BrainSTEM Mentor Experience

HIGHLIGHTS

The BrainSTEM Rural Innovation Challenge was part of the GIPPYAg project, an initiative of Food and Fibre Gippsland in partnership with CQUniversity Australia with financial support from the Victorian Government. The BrainSTEM program provides the opportunity for students interested in Science, Technology, Engineering and/or Mathematics (STEM) to engage with industry professionals to undertake a research project over a 12-week period. In 2019, the theme of the challenge was the food and fibre industry in Gippsland.

Eight teams of four students and their mentor embarked on projects from reducing greenhouse gases on a dairy farm, creating QR Codes to provide consumers with more information on where their vegetables had come from, developing a cattle health scanning program, measuring and controlling botrytis in greenhouses, promoting the provenance of Gippsland's produce, making careers in dairy more attractive and an investigative approach to comparative milk pricing.

This case study reports on the mentor's perspective of being involved in BrainSTEM and their experience, learning and observations about student's interest and knowledge in the food and fibre industry.

Various factors motivated mentors to participate, with many reporting that they wanted to 'give back' the skills, knowledge and experience they had gained throughout their careers to students and the community. Mentors reported that they appreciated looking at industry through a different lens and welcomed the transfer of knowledge to our future generation of leaders. Mentors identified the BrainSTEM program as having far reaching benefits not only for themselves and the students but also positive impacts on the food and fibre industry, both in the short term as students gained an appreciation of the real-world application of STEM and challenges faced within the industry, but also longer term benefits if students considered the food and fibre industry as a potential career path.

PROJECT OBJECTIVE

The aim of this research case study was to determine how the role of a mentor influences student engagement with an industry problem and to use this insight to develop a functional mentor-student model of engagement to maximise benefits for students, mentors and the food and fibre industry.

BACKGROUND

BrainSTEM (brainstem.org.au) is a not-for-profit organisation that run a range of innovation challenges in both metropolitan and regional Victoria that aim to provide high school students with the opportunity to be mentored by industry experts, scientists and university academics to design, research and develop an innovative solution using STEM to a real world problem. BrainSTEM has been running challenges since 2016, however, this challenge was only the second based in regional Victoria and the first related to the food and fibre industry. Schools and mentors were invited to apply for the program and in doing so committed to participating for the 12 weeks.

In August 2019 the student groups and their assigned mentor attended an introduction day where they discussed challenges faced by industry and the region, and collaboratively decided on a topic to address.

In the 12-weeks following, mentors engaged with their student teams on a regular basis to progress their idea into reality. In addition to face-to-face or online meetings, some groups also participated in field trips to gather information and data related to their projects, such as commercial farming operations, research facilities and milk processing factories.

The challenge concluded in late October 2019, when the groups presented their innovative projects to a captive audience of other schools, teachers, parents and the general community. The presentations encompassed the student's journeys throughout the challenge, including their initial approach, successes and challenges along the way concluding with a summary on their findings.

The structure and delivery of supporting materials for the Rural Innovation Challenge were provided by the BrainSTEM organisation. The role of the GIPPYAg project was to recruit mentors and support their interaction with students. In addition, research was conducted to evaluate the program and identify any areas for improvement. The research consisted of pre- and post- surveys and semi-structured interviews for students (reported in a separate case study) and a series of interviews with industry mentors.

Mentors were interviewed before, during and after the challenge to record their experience with the challenge, their motivations for being involved and report any feedback related to engagement with students, increasing awareness about the food and fibre industry and suggestions for future challenges. Mentors responses were categorised using a thematic analysis. Responses were summarised into more than one category, thus most questions had more responses than mentors.

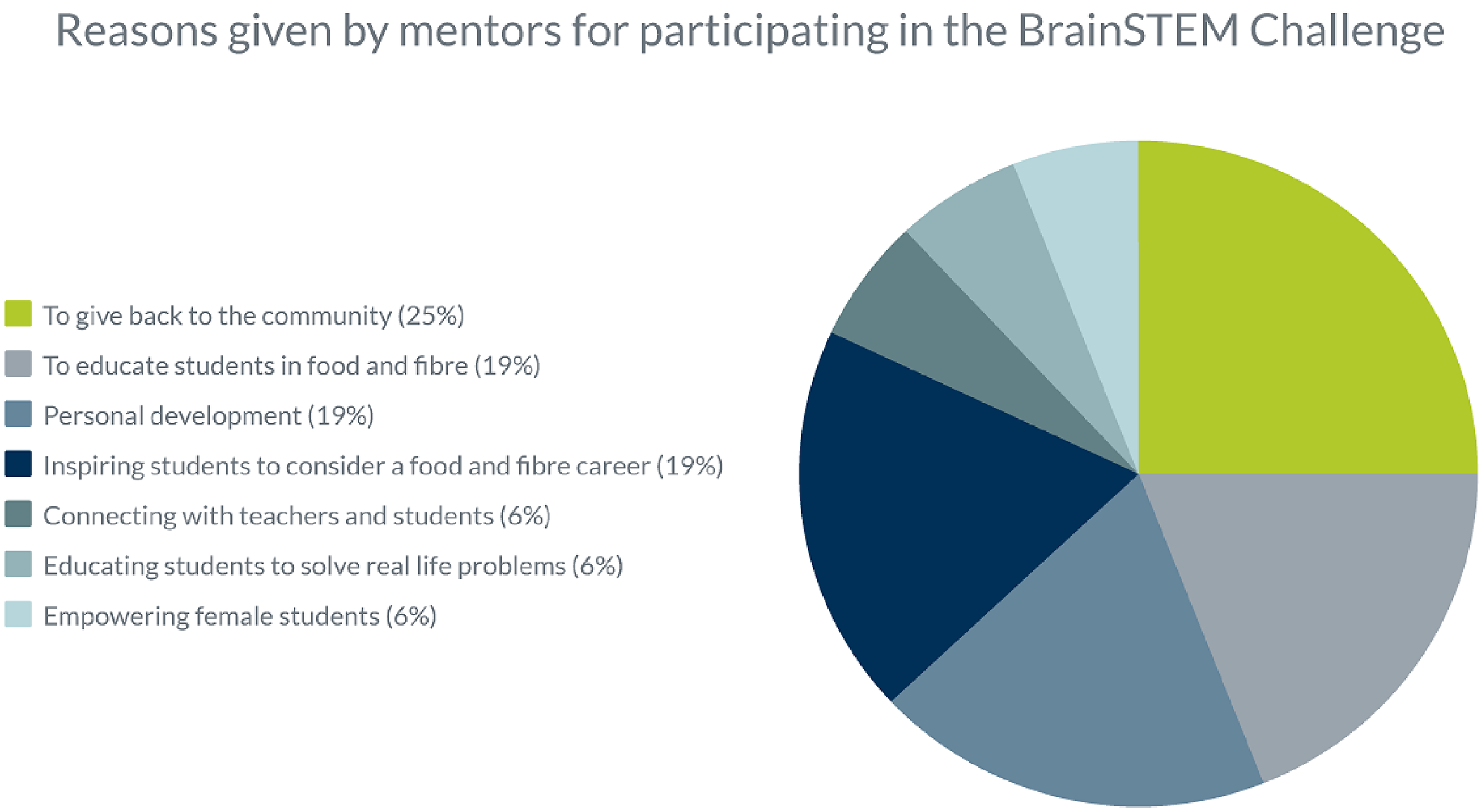
PARTICIPANTS

The below table shows the mentors who participated in the challenge and their backgrounds.

Region	Industry	Sector	Organisation type	Gender
Central Gippsland	Dairy	Extension	Government	Female
East Gippsland	Horticulture	Growing & distributing	National business	Male
	Dairy	Research & Development	Government	Male
	Food and Fibre	Communications	Not for profit organisation	Female
South Gippsland	Dairy	Consultancy	Self employed	Male
	Biosecurity	Research & Development	Government	Male
West Gippsland	Dairy	Research & Development	Government	Male
	Horticulture	Research & Development	National business	Female

RESULTS

Eight mentors completed the pre- and post- program interviews as well as interviews midway through the program. The main reason reported for participating in the challenge was to give back to the community (25%), as evidenced by one mentor who stated 'I've got a passion to mentor young people and I believe in the principle that giving is better than receiving. I feel I've got a lot to offer and it's tucked away. When I was asked to get involved I thought 'yeah, that could give me an opportunity to give back'.



Mentors foresaw a range of benefits for the students who participated in BrainSTEM, with the most prominent relating to providing students with insight into the industry (46%). While some students had agricultural backgrounds, mentors highlighted that they may not always have a clear understanding of the supply chain outside of the farm gate.

'This way they can get a little more insight about what their parents have to deal with, what the actual outcome of the industry is and how the consumers get to the products.'

It's good to give the students a little more of a background into what the day to day involves within the agriculture industry.'

'It's really about increasing their awareness of what industries are out there and how they can contribute to adding a wider lens.'

Mentors also saw student benefits in assisting students to develop independent learning skills by encouraging them to take responsibility for their own tasks (23%). While the students in many groups were initially unsure about how to undertake their designated tasks, primarily due to working on a project in an unfamiliar area, mentors encouraged students to think broadly about their project, prioritise tasks and work towards deadlines. One mentor explained their way of managing this aspect of the program, 'It would have been really easy for me to tell them what to do, because that's what I think is a really quick trap to fall into with this age group. They're not lazy. It's just that their brains haven't delved into that true big picture thinking in something of this scale unless you make them.'

'We pushed them along saying, 'so, you're going to have this done by next week' and 'who's doing this' and 'who's doing that' and then we sat with them and said, 'show us what you've been doing' and so we made them more accountable.'

'I could sit there and tell them do this, this and this, and we could get a really good solution, but it wouldn't be their idea, it'd be mine. I wanted them to figure that out, so I gave them all the tools to figure it out for themselves.'

'We've got to be mindful that they've got to fit all their normal classes in, and the transport to meet after school, it is different expectations to what we have in the workforce'

Other benefits for students related to providing a real-world context to school curriculum (15%) and giving students insight into career opportunities (15%); five of the seven mentors reported their student group members enquired about their career path and asked questions about their current and previous jobs, allowing students the opportunity to learn about different career options and possibilities.

These student benefits translated into benefits for both the mentors and industry, with 57% of responses related to inspiring mentors to think differently about their role whilst also bringing new ideas into industry. Other industry benefits identified by the mentors from engaging with students to tackle industry-related problems were raising awareness about the industry (29%), such as the processes and issues faced, as well as educating and inspiring the future potential workforce (14%).

'When you work in an industry you get sort of stuck and think, 'Oh, this is how we solve this problem' but bringing in the students they have a lot to offer.'

'Some of the craziest ideas have come from people that have been in no way connected to whatever the problem is, but they've just kind of looked at it, you know, from the back of the football stand and gone, why don't you just, why don't you just try that? And people will go, why didn't we just try that?'

'It's actually really simple... The beauty of the young mind and their un-cynical thinking, just looking at the issue for what it is - that's a powerful little knowledge trait to encourage to grow, really.'

Mentors reported a range of personal benefits from participating in BrainSTEM, primarily related to becoming aware of the way young minds think (40%) and learning how to explain concepts and ideas in a simplified way (20%). Mentors also mentioned they acquired new skills in mentoring (13%) and undertaking something new and out of their comfort zones (13%). Two mentors reported that they found the program rewarding and one found the simplicity but effectiveness of their project a refreshing way to approach a current industry issue.

'It has taught me more about how to work with kids that aren't really experienced in the field and how to communicate my research with people who aren't experienced in agriculture.'

'I loved working with the girls, they were a really great bunch of girls. They all seemed to really want to extend themselves,'

'I really enjoyed it. It was a great opportunity to meet with some young people. I felt really encouraged at how thoughtful that the students were in investigating the issues. For our industry, but overall for me it was a really positive experience and I think for our students too.'

Mentors also reported on positive student related outcomes they experienced throughout the program, primarily related to having engaged students (33%), witnessing student development and learning (25%), working with a supportive teacher (25%) and providing students with real-world experience (17%).

When comparing the mentors experience throughout the program, mentors reported a similar number of student related outcomes at both the midway and final interview (n = 7), however, more than four times the number of mentor related outcomes were reported at the end than midway through the program (17 and 4 benefits, respectively). This finding may be a result of mentors reflecting on the journey they had undertaken with the students and realising the progress they had all made throughout the process; it may have been easier for them to identify student progress throughout the program whereas they may not have realised the benefits they received until the project was complete.

'The information we got towards the end was great with what they needed to put in their presentation, but we'd been discussing that from the beginning, and didn't have the information.'

While most mentors reported positive outcome from participating in BrainSTEM, they also reported aspects that could be improved on in future. A lack of guidelines and information about what was involved in the program and its structure was reported the most (19%), for example, topic choice, level of mentor's involvement, expected level of interaction with students and what they were expected to accomplish throughout the challenge. Some of this information was provided along the way, but many mentors felt this came too late and would have been more helpful if it was set out at the beginning, Four of the eight mentors stated they were disappointed with the level of support received from their teams' school, which may have improved the level of contact the mentors had with their group, which was reported as an issue by the same four mentors.

Most of the mentors had not worked with students before and initially found the process challenging, especially related to not knowing how much support to provide, feeling like they had to assist students more than expected and being unskilled in mentoring students. The learning experience of dealing with students was seen as a positive challenge for some.

'I don't have experience with high school students. I don't have kids, so I don't know what to expect from them or what type of presentation is expected at that level.'

'It's a real learning experience of how to actually explain stuff to people. And, you know, it sort of connected with me on the weekend when I had a teacher friend of mine say 'Year nine girls, they'll just be jumping straight to the doing parts!' So that kind of gave me a little bit of perspective, and that's a different learning.'

'I work with engaged employees, they have to do what I tell them to do and I'm delegating to them, whereas the kids, they don't see me in that light, and I think they compare me with a teacher, and I'm so not a teacher. I have to play the game of encouraging and saying, 'maybe this is a good idea to do this.'

The benefits obtained from serving as a mentor for students had a positive impact on most, with six of the seven mentors willing to participate again. While many experienced challenges throughout the program, seeing the project through to the end allowed them to witness all of the benefits the program has to offer, which was evidenced by one mentor not being willing to participate again when asked at the midway point but then change their mind at the end, realising that they had a lot to offer after having experienced both the highs and lows of the journey. 'I answered this question last time and I said no. Look, probably after the presentation I would say yes. I'd probably have to look at it differently though, and the hard part for me is I'm self-employed I've actually got to justify the time. While I think there's reward to it, I've also got to be wary that what's that cost me as well. So I probably would do it again but I'd structure things a bit differently, but that's probably through the experience that I know how things sort of work now.' A suggestion by one mentor was to have a mentor for the mentors, to assist new mentors both in terms of professional practice and from an individual perspective so that both the mentors and the students get the most out of the program. Two mentors identified that they needed to be highly self-driven to provide appropriate support for their students and develop a framework about how they will manage student expectations and communication.

SUMMARY

The BrainSTEM Rural Innovation Challenge was designed to inspire and educate students about the food and fibre industry through the input of highly educated, experienced and specialised industry experts. The experience provided mentors with novel experiences not previously encountered in professional practice and gained transferrable skills in communication, self-development and a general appreciation for looking through the lens of a teenager's eyes.

The below chart shows the words most commonly used by mentors reflecting on the challenge.

Mentors not only gained personal benefits for themselves but found the process rewarding by witnessing student growth, development and raising awareness about the food and fibre industry and issues faced. The extent of this learning is difficult to achieve in a classroom; these students have received a unique opportunity to further their personal and educational growth.

The program outcomes highlight the importance of schools, mentors and students being committed and working together, with the results demonstrating that mentors who had strong connections to the school and effective communication structures in place with their students reporting the greatest benefits.

The success of the first food and fibre related BrainSTEM challenge provides resounding evidence to continue the program in future. Mentors provided detailed and useful feedback about modification for future challenges, primarily related to providing structured guidelines around procedures and expectations. Creating a support network between mentors within a current challenge with those of previous challenges allows future challenges to become more successful and beneficial from the last, resulting in greater outcomes for mentors, students and the industry in general.