SO WHAT?
The STEM Studio has demonstrated the potential impact that professional learning and community of practice can have on enhancing initial teacher education. Key to the STEM Studio was the collaboration between key participants from higher education – teacher educators, scientists and pre-service teachers – and high schools – principals, practising teachers and school students.

The STEM Studio has contributed to change in higher education practices through:
- Development of an effective framework for cross-faculty collaboration and working across higher education, high school systems and industry.
- Development of cross faculty relationships leading to collaborative course design and delivery, formalised in curriculum structures/processes.
- New ways to support the integration of content and pedagogy through authentic practical experiences and mentoring by teacher educators.
- Providing opportunities for PSTs to increase self-efficacy and develop an richer professional teacher identity.

FEATURES
Different models of the STEM Studio have been trialled at multiple institutions across Queensland, Australia, including QUT, James Cook University (JCU) and Griffith University (GU).

Common to each model are the STEM Studio interactions between disciplinary experts, mentor practising teachers and novice PSTs in the exploratory third space and the way they have and will continue to encourage each participant (PST) to rethink their disciplinary knowledge, discourse practice and assumptions in learning from each other in design and delivery of innovative STEM curricula.

The STEM Studio provides a safe non-assessed authentic and supportive environment for pre-service teachers to connect theory and practice and trial new teaching approaches.

Across the three institutions, the STEM Studio has involved 6 high schools from south-east Queensland, experienced and innovative teachers in STEM education (14), STEM experts (18), museum educator (1), teacher educators (4), PSTs (47) and over 450 high school students.

OUTPUTS
- STEM Studio has developed a framework for collaboration across higher education, high school systems and industry partners in a third space.
- STEM Inquiry Process model
- Resources developed by PST’s
- Griffith STEAM studio model will be used to design a course for pre-service teachers.
- Conceptualising the STEAM field as fields of inquiry has allowed those at Griffith to unify the fields under one common process, with variations in response to the nature of the student project.

Resources accessible at www.stepup.edu.au/stem-studio

IMPACT
A learning community of emerging mathematics and science teachers actively engaged in an inter-disciplinary, professional community of practice.

The STEM Studio provided a rich environment for Student engagement and PST’s building networks. PST’s that undertook the STEM Studio:
- Remained in contact with peers through a Facebook group.
- Remained in contact with the schools (incl. 4 students offered prac at the school).
- Where 88% more likely to take part in other student engagement opportunities including professional development.

Connecting maths/science content with pedagogy, values and principles.

The support network created by the STEM Studio (STEM experts, teacher educators and in-service teachers) helped pre-service teachers connect content and pedagogy and influenced their scientific thinking process. Pre-service teachers thought more deeply about their lesson plans and were more invested in what they developed.

Developing the professional identity of STEM teachers.

Preliminary data showed positive changes in PST self-efficacy (pre and post testing) after teaching in the STEM Studio especially in the areas of effective instruction, motivating students and coping with change in the classroom. Influencing the mindsets of future teachers is critical to overcome doubts and fears about their capability and confidence to teach in the STEM areas. This will be further explored through qualitative analysis focusing on collaboration between participants, professional identity, support mechanisms, teaching practices and connections between the STEM Studio and ITE courses.

WHAT NEXT
Ongoing discussion around transition of the learnings of how STEM Studio model could translate into the Bachelor of Education degree. The STEM Studio involves academics who teach directly into PST courses. Involvement in the project has deepened their understanding of the challenges faced by ISTs and PSTs as they attempt to improve their mathematics and science pedagogical content knowledge and teaching practices.

The STEM Studio adds value to the pre-service teacher pipeline and compliments other Step Up initiatives by providing a space to trial/practise learnings from these programs whilst collaborating with scientists, teacher educators, industry and in-service teachers in an authentic classroom environment.

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