School Based Research Project

Final Report

Improvement science and the development of resilient agency

Ravenswood School for Girls

Improvement Science and the Development of Resilient Agency

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Executive Summary

This research project aimed to investigate whether the improvement science methodology would be a suitable form of professional learning to create and sustain change. The project leaders hoped this methodology would lead to improvements in teacher practice, specifically, practices aimed at developing the resilient agency of Year 9 students.

In order to achieve this, a group of Mandatory History and Mandatory Geography teachers participated in a series of professional learning experiences following the principles of improvement science. Through a process of disciplined inquiry, the teacher-researchers designed a series of 'interventions' based on the Plan-Do-Study-Act cycle. Students responded to two surveys, one to assess their experience of learning within these subjects, and the second to measure their resilient agency before and after two terms of interventions. Teacher-researchers composed written reflections on the impact of the improvement science methodology on their individual and team practice, as well as their observations of students' learning and resilient agency throughout the study.

The results of the study indicate that the improvement science methodology was an appropriate form of professional learning for creating change. All teacher-researchers noted the positive impact of the disciplined inquiry on their individual and team practices. This was confirmed by students' responses to the survey assessing their experiences within these subject areas. The intentional approach to developing students resilient agency through carefully constructed educational experiences resulted in positive growth, as assessed by both the survey tool and teacher reflections.

Background

Throughout 2014, Ravenswood had been investigating the engagement levels of its students across the school. Through the analysis of exit surveys, student focus groups and a program of shadowing students, a group of teacher researchers examined levels of student engagement in the school. In addition to a worrying level of cognitive disengagement, teachers of students in the HSC course were reporting higher levels of student dependency, risk aversion and fragility. Ravenswood students responded to a GELP survey conducted by AITSL to try to understand patterns of engagement across the country and the globe. The survey results presented a contradictory view – while 88% of Ravenswood students report 'being interested in what they are learning at school', 41% report 'often feeling bored at school' and 39% 'spend a lot of time pretending to pay attention'.

The complete data set was presented at a staff day in the second semester of 2014 and the staff were invited to consider their responses to the data. Many reported being surprised by the hidden disengagement in Ravenswood classrooms and enthusiastically participated in structured small group discussions of the learning conditions and teacher practices that may contribute to higher levels of cognitive engagement using AITSL's 4 design principles for engaging learning – connected, co-created, personal and integrated. An unexpected outcome of the staff learning day was that when asked to consider existing examples of learning that exemplified the four design principles, most Secondary School examples cited were learning experiences that occur outside of the curriculum and classroom. Examples included, Australian Business Week, Creative Curriculum, musical participation, field work, excursions, '4 the Future' and overseas service-learning trips. There were examples of engaging learning occurring within classrooms cited but they were mostly confined to the Junior School or the International Baccalaureate Diploma programme.

The staff feedback gathered, along with the student focus group and shadowing program findings, were presented to staff in 2015 and small group discussion ensued leading to a collective commitment from staff that there is more we can and must do to equip and

empower students to be meaningfully connected to their learning inside and outside of the classroom. Staff agreed that we cannot continue to say that our Year 12 HSC learners are passive or dependent and expect them to be different if their learning experiences do not require them to be different prior to them becoming senior students. They also agreed that engaging learning experiences that were cognitively challenging needed to be the norm, not the exception so that Ravenswood has fewer quietly disengaged, yet compliant students.

In 2015 visiting the Connected Intelligence Centre at UTS provided an opportunity to learn about the concept of resilient agency and the work of Professor Ruth Deakin Crick. Crick (2015) asserts that r**es**ilience enables people to respond positively to challenge, risk and uncertainty. We were drawn to the work of Crick et al. (2015) because they focus on increased resilience as an outcome of focusing on developing student awareness, ownership and responsibility for learning. This conceptualisation empowers teachers to be architects of learning experiences that can develop resilience instead of requiring them to address therapeutic issues that are not within their professional expertise. Teachers work to equip our learners with the necessary skills and dispositions for learning that may lead to their developing higher levels of resilient agency and assist them to become more effective learners.

Literature Review

Student Resilient Agency

Learning is a complex interplay between the learning context, the self as learner and the relationship between that emerging 'self' and what is to be learned. Crick (2015) asserts that **r**esilience enables people to respond positively to challenge, risk and uncertainty. A lot of the literature on resilience focuses on the link between resilience and emotional wellbeing and often approaches the concept from a deficit perspective. A definition drawn from the literature, **"**The ability to cope and bounce back after encountering negative events, challenging tasks, difficult situations or adversity and to return to almost the same level of emotional wellbeing; the capacity to maintain a healthy and fulfilling life despite adversity and even be strengthened by the experience" (McGrath & Noble, 2003 in ACU and Erebus International, 2008) is illustrative. However, Crick et al. (2015) focus on increased resilience as an outcome of focusing on developing student awareness, ownership and responsibility for learning. In this way Crick et al. see learner agency as an 'organising framework for different constructs – such as self-efficacy, grit and growth orientation' (2015, p.150). This conceptualisation empowers teachers and mentors to be architects of learning experiences that can develop resilience instead of requiring them to address therapeutic issues that are not within their professional expertise.

For students to develop resilient agency, it is asserted that educators need to design learning experiences which enable them to take increasing responsibility for and ownership of their learning. Internationally, the Teaching and Learning International Survey (OECD, 2009) investigated, amongst other factors, the classroom teaching practices of teachers of young adolescents. The survey, conducted across twenty-four countries, addressed three dimensions of classroom teaching practice; structuring, student-oriented and enhanced teaching practices. The results were regarded as remarkable due to the fact that structuring teaching practices, predominantly teacher-centred practices, were the most frequently employed in lower secondary classrooms across all participating countries, Australia included. These were preferred practices over student-oriented practices, including small group work, student self-evaluation and student participation, and enhanced teaching practices, which include producing and

creating knowledge. This large-scale research speaks to the teacher-centric, content driven classroom evident both nationally and abroad. The challenge faced by educators who value student resilient agency is to design learning experiences which move beyond dependence on the teacher and towards increased student participation in collaborative activities in which students own and produce knowledge through student-led enquiry (Deakin-Crick et al., 2011).

Improvement Science.

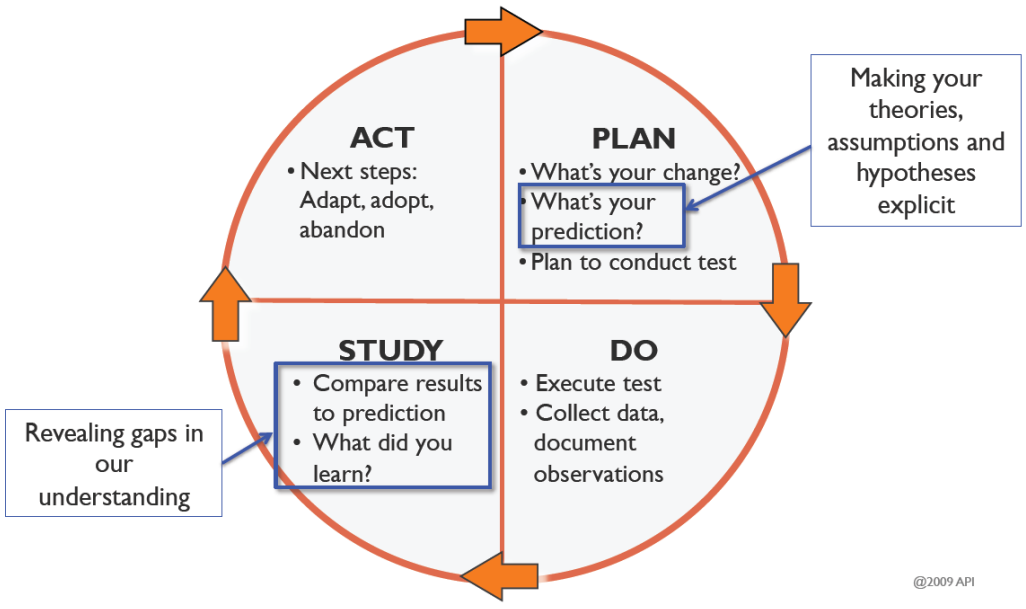
Professional learning can have a substantial positive impact on student learning and achievement (Timperley, 2011). Albers & Pattuwage (2017) noted the limitations of ready-made programs to effectively promote the application of research based evidence in schools and classrooms as well as the inefficiency of single exposure training in enabling educators to apply new knowledge in the classroom. Whilst the education sector increasingly moves towards 'evidence-based practice' Bryk et al. (2015) suggest that teachers have been confronted with a professional knowledge explosion; however, rather than believing that the route to improved outcomes is to continually add new programs, he suggests that educators need to focus on increasing their understanding of the systems which create unsatisfactory results.

Improvement Science is a 'methodology for using disciplined inquiry to solve a specific problem of practice and brings analytic discipline to design-development efforts and rigorous protocols for testing improvement ideas' (Bryk et al., 2013); it follows six principles (see Image A). The application of this methodology enables an organisation to learn from its own practice to continuously improve, with a key focus on what works, for whom, and under what conditions. The methodology is problem centred, not solution centred; 'Solutionitis', describes the 'form of group think-in which a set of beliefs crystallizes based on an incomplete analysis of the problem to be addressed and without full consideration of potential problem-solving alternatives' (Bryk et al., 2015, p468). Instead, central to continuous quality improvement is the Plan-Do-Study-Act cycle (see Image A) which enables iterative, short term, disciplined inquiries aimed at consistent, quality practices.

Image A: The principles of improvement science.

Bryk et al. (2015)

Image B: The Plan-Do-Study-Act cycle Improvement Science.



Bryk (2015)

Research Aims and Questions

Broadly, this research project aimed to investigate whether the improvement science methodology would be a suitable form of professional learning to create and sustain change. The project leaders hoped this methodology would lead to improvements in teacher practice, specifically, practices aimed at developing the resilient agency of Year 9 students. As such, he aims of this research were to;

- investigate improvement science as a framework for promoting and sustaining change.
- measure the short and long term impact of this model on teacher and student learning outcomes.
- investigate and evaluate practices and interventions that may contribute to the development of resilient agency in Ravenswood students.

Research Questions:

1. What is the impact of an improvement science model of professional learning on teacher practice?
2. What is the impact of an improvement science model of professional learning on student learning experiences?
3. What are the teaching and learning practices and/or interventions that may lead to the development of students' resilient agency?

Method

Participants

Participants in this study were Year 9 students (n=130) and academic staff from History and Social Science faculties (n=8) who were teaching these students in Mandatory History and Mandatory Geography in 2016/17. As students enter Year 9 they are moving towards being senior learners. The choice of Stage 5 provides us with two years to design learning experiences and interventions to prepare them for the final two years of schooling. Year 9 students and their parents received an information sheet detailing the aims of the project. It should be noted that due to staff attrition, the teacher-research team changed in 2017.

Research Design

Action research is a systematic procedure whereby educators gather information about and subsequently improve teaching and learning (Cresswell, 2012). Within schools, this research design offers educators the opportunity to reflect on their practice, and provides the school with a mode of staff development (Allen & Calhoun, 1998). However, specific to this study, we chose improvement science, as a methodology which 'disciplines inquiries to improve practice' (Bryk et al., 2015, p10) as the team was drawn to the principles, tools and inquiry processes which would guide the inquiry, as outlined below.

Improvement Science Principle	Tools to guide inquiry
Be problem specific and user-centred	Engagement with data
Attend to variability	Engagement with data
See the system	Causal analysis – 'Fishbone Diagram' Driver Diagram
Embrace Measurement	Devise appropriate data collection
Learn through disciplined inquiry	Plan-Do-Study-Act Cycle
Organise as networks	Sharing learning

Data collection

To answer the research questions, it was necessary to collect and analyse both quantitative and qualitative data. Table A outlines the timeline of data collection.

- Impact of improvement science on teacher practice

To measure the impact of the improvement science model of professional learning on teacher practice, teachers were asked to compose written reflections at three points throughout the study, at the conclusion of each iterative cycle. These reflections were read by the project leader and a preliminary exploratory analysis completed.

- Impact of improvement science on student learning experiences

As a balancing measure and to assess whether interventions designed through the Improvement Science methodology did impact students' learning experience, data was gathered through the survey, 'What is your experience as a student?' developed by Grant Wiggins, and modified with his permission for use in an Australian school context. This survey was administered to all Year 8 and 9 students in November 2015 to provide baseline data. Selected questions were administered after each iterative PDSA cycle in terms 2 and 3 in 2016, and again after term 2 in 2017. The full survey was administered again in to all Year 8 and 9 students in November 2016.

- Students' resilient agency

- To measure student resilient agency, Year 9 students completed CLARA (Crick Leaning for Resilient Agency) a research validated online survey tool (Crick et al. 2015). This was a correlative measure to assess the resilient agency of students as they moved through Year 9. Due to the timing of the research project, the CLARA tool was administered in 2016 only.
- Teachers written reflections at three points throughout the study, at the conclusion of each iterative cycle. These reflections were read by the project leader and a preliminary exploratory analysis completed.

Table A: **Timeline of data collection**

Timeline		Participants
Term 4, 2015	Improvement Science Workshop	Project Leaders
	Wiggins Survey	Year 8 ,2015 Year 9, 2015
Term 1, 2016	Improvement Science PD	Year 9 History & Geography Teachers
	Planning of interventions and practices.	Year 9 History & Geography Teachers
	Improvement Science PD	Year 9 History & Geography Teachers
Term 2, 2016	CLARA Online Survey	Year 9 2016
	PDSA Cycle 1	History & Geography
	Improvement Science PD Teacher reflections	Year 9 History & Geography Teachers
	Wiggins Survey	Year 9 2016
Term 3, 2016	PDSA Cycle 2	History & Geography
	Improvement Science PD Teacher reflections	Year 9 History & Geography Teachers
	Wiggins Survey	Year 9 2016
Term 4, 2016	CLARA Online Survey	Year 9 2016
	Wiggins Survey	Year 9 2016
	Teacher Reflections	History & Geography Teachers
Term 1, 2017	Improvement Science PD	New Team members
	Planning of interventions & practices.	History & Geography Teams, 2017.
Term 2, 2017	PDSA Cycle 3	History & Geography Teachers
	Teacher Reflections	Year 9 History & Geography Teachers
	Wiggins Survey	Year 9 2017

Results

The aim of this research project was to investigate improvement science as a model of professional learning and to examine whether this model could lead to sustained changes in teacher practice, resulting in growth of student resilient agency.

Research Question 1. What is the impact of an improvement science model of professional learning on teacher practice?

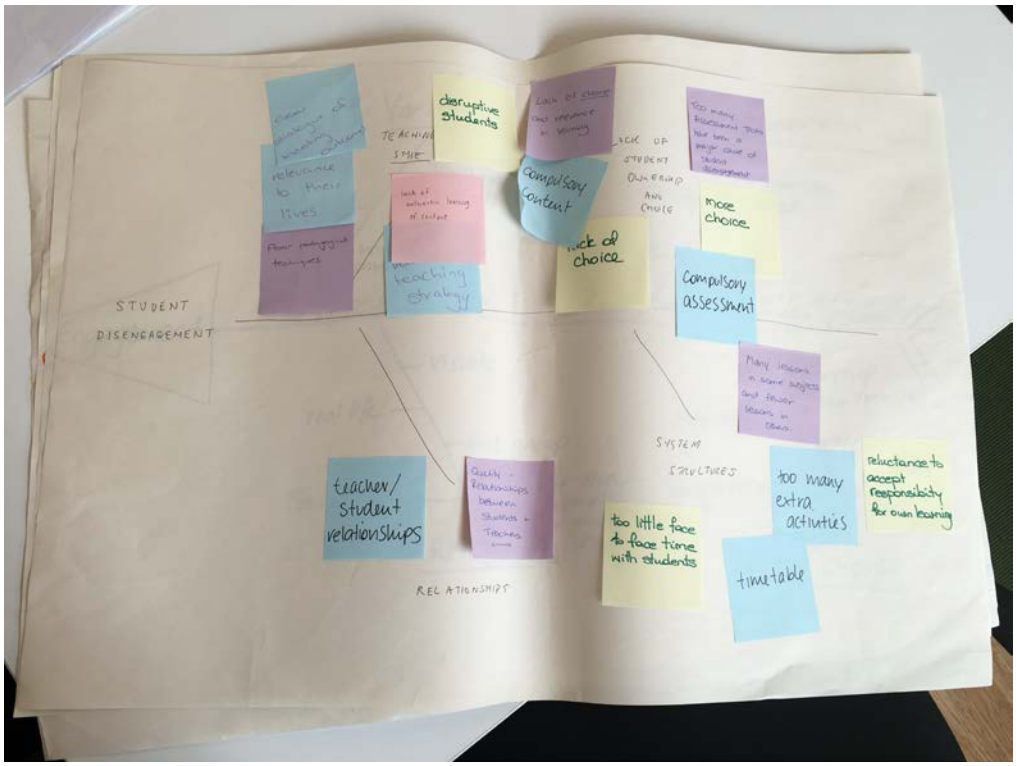
One of the three aims of this project was to investigate Improvement Science as a framework for creating and sustaining change within a school setting. The Improvement Science Methodology was used as an approach to professional development to address the concerns regarding students' resilient agency emerging from school based exit surveys and the results from a GELP Student Engagement survey in 2014. The funding support enabled members of the Ravenswood Education Research Team to participate in a one day workshop with Dr Anthony Bryk, President of the Carnegie Foundation for the Advancement of Teaching, Stanford, in November 2015. During this workshop, team members learnt about the principles of Improvement Science and had the opportunity to apply the tools of the methodology under the tutelage of Dr Bryk. Further reading of relevant literature and research in Improvement Science led the Project Leaders, Terrie Jones and Amy Van Arkkels, to devise appropriate professional learning for Ravenswood staff members directly involved in the research project, adhering to the methodology.

This professional learning, beginning in January 2016, involved Year 9 teachers engaging with data collected in November 2015 (see Image A). The initial stages of data analysis proved to be confronting for many teachers involved in the process and there was evidence of an initial defensive reaction to the data with which they examined. The tools, including a causal analysis (see Image B), proved productive in unpacking systemic factors which team members believed had led to the cognitive disengagement of Year 9 students. The product of these initial steps was the team devising an Aim Statement regarding an increase in the use of 'helpful teaching practices' in History and Geography by November 2016, a question in the initial Wiggins' survey.

Over the course of Semester One, 2016, the Education Research Team engaged with further principles of Improvement Science in order to address the aim of improving Year 9 students' cognitive engagement with Mandatory History and Geography and increasing students' resilient agency. In the first stage of the methodology, teachers engaged with data collected through the Grant Wiggins' Survey, '*What is your experience as a student?*', which was implemented with Year 8 and 9 students in November 2015. Staff read qualitative responses and viewed data visualisations. The steps involved with the model of disciplined inquiry proved easy to follow, whilst the rigor of analysing the pedagogical approaches was challenging (Image D). The working theory of improvement, or Driver Diagram (see Image C), provided both the History and Geography teams with a clear plan for improvement which directed iterations of pedagogical interventions throughout Terms 2 and 3, 2016 and Term 2, 2017. Both History and Geography teams devised Plan-Do-Study-Act cycles (see Image E) to structure the inquiry.

Image A: Teacher-researchers engage with the data.

Image B: Causal Analysis of Student Disengagement



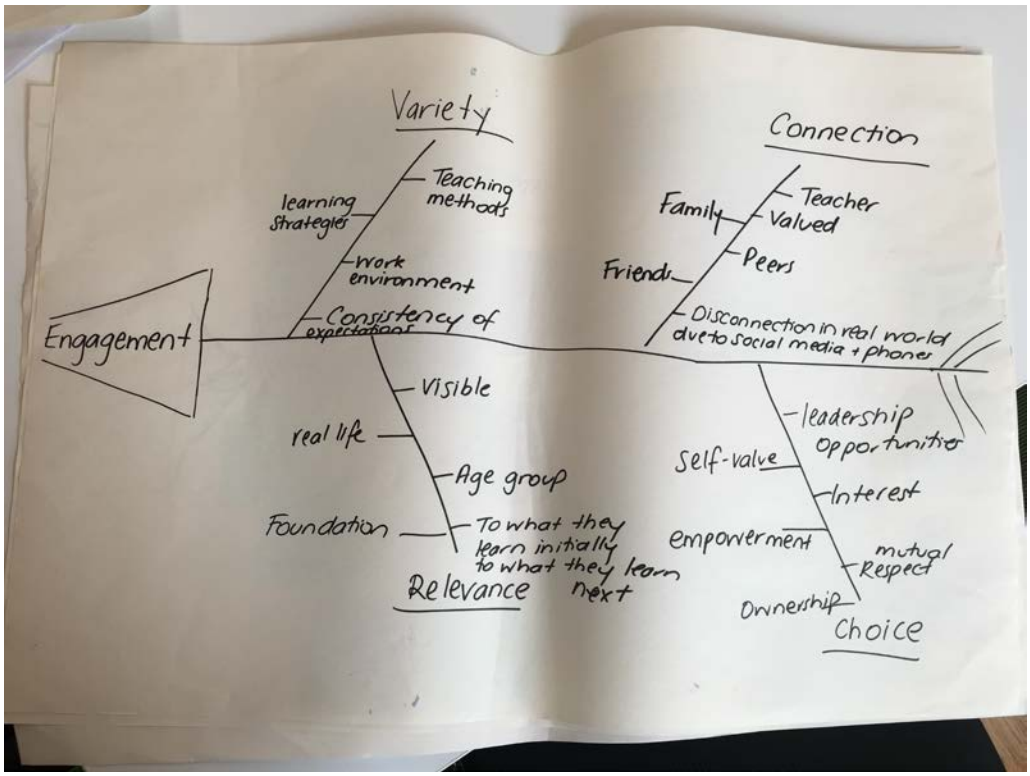
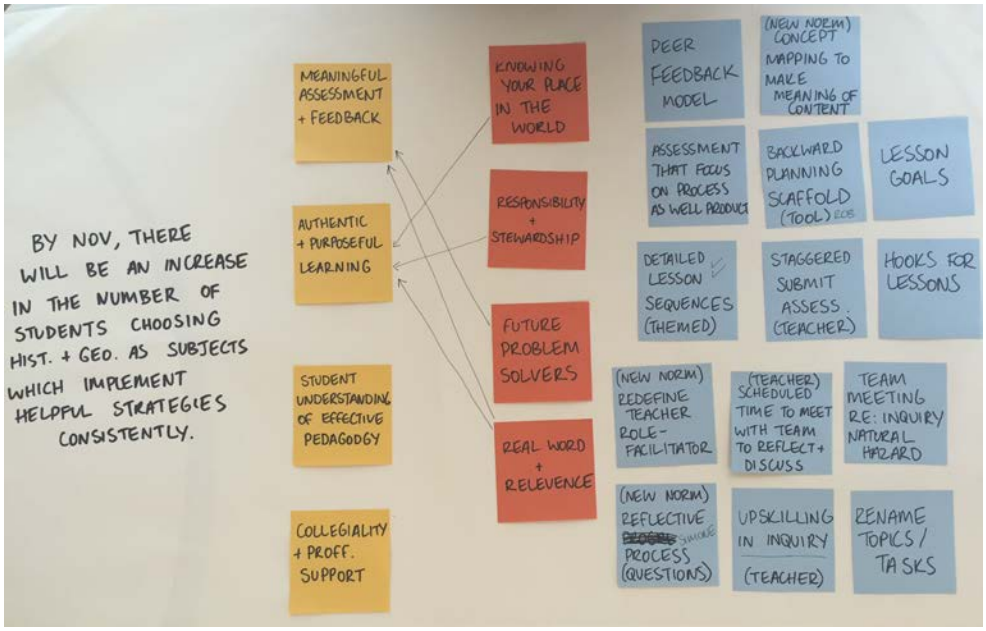


Image C: Working Theory of Improvement – Geography and History



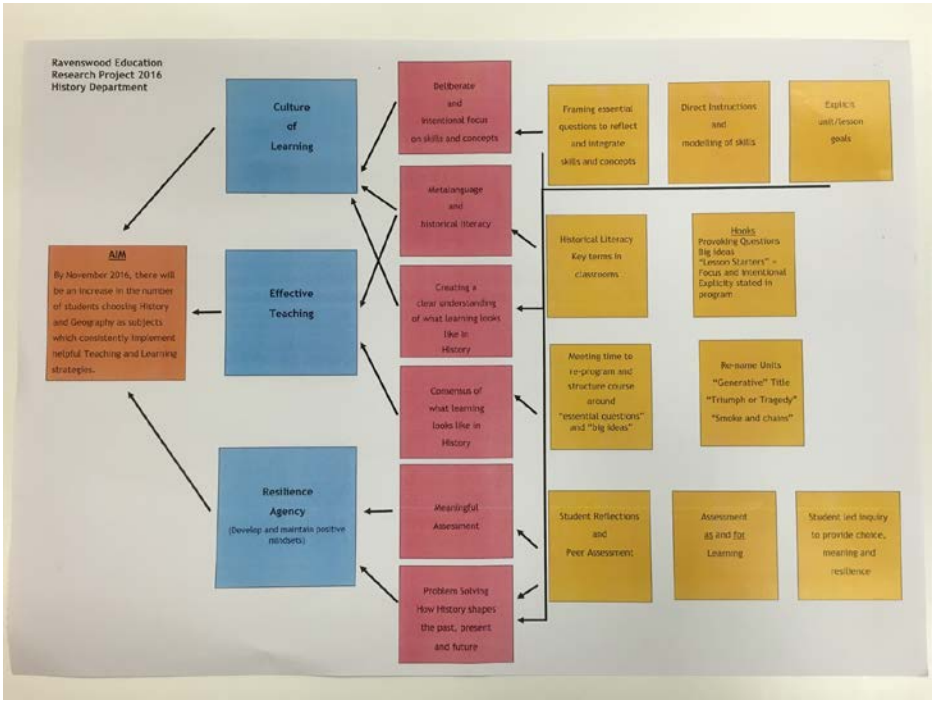
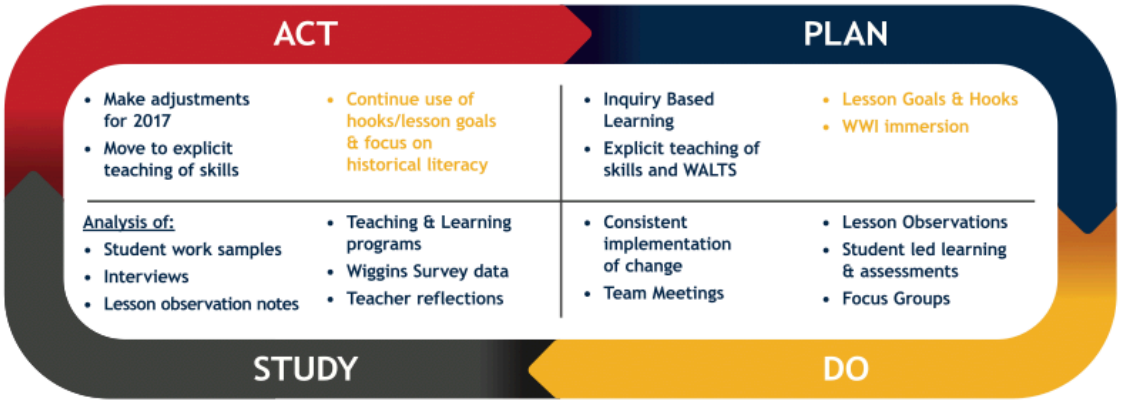


Image D: Teachers develop and share their working theory of improvement.

Image E: PDSA Cycles Terms 2 and 3 2016.



Teacher-researcher reflections

Teacher-researchers completed individual reflections on the impact of the improvement science model of professional learning. Over Terms 2, 3 and 4 in 2016 and in Term 2, 2017, individuals were asked to respond to the following prompt: *'I am wondering if you could each write an individual reflection on the impact the research project has had on your individual practice, your faculty or team, and the learning outcomes for the students.'* These responses were read and a preliminary exploratory analysis was completed before coding. Three key themes and one minor theme were evident. Teams also completed group reflections as seen in Figures A and B which summarised their individual reflections.

1. ***Increased collegiality leading to sustained, consistent practice.***

All members of the research team noted significant development in the collegiality within each team and this was the primary theme which emerged from the reflections. References to the protocols involved in improvement science were evident throughout their reflections and demonstrated a strong knowledge of the framework and the way in which it allowed teams to focus attention on necessary improvements to practice. Teachers referenced the consistency in practice within the team and the way in which this had developed within a brief period of time.

- *'The AIS project has played an important role in increasing the History Faculties collegiality and focus on historical skills and Meta language. In order to ensure that the historical skills and meta-language was consistent across History, we worked closely to develop programs and lessons that reflect these goals. We developed hooks, essential questions, lesson goals and tasks that worked towards ensuring the students developed the ability to articulate their historical skills in formative and both summative tasks. For example, a Year 10 assessment this year focused on the concept of significance. The Year 10 team developed an extended essay and research task that provided students with the opportunity to articulate the historical concept. The results were good and we were pleased with how the students dealt with this difficult concept.'*
- *'New members of the Year 9 team have commented on the changes made and the significant improvement in student engagement. They have been fulsome in their praise. There has been a positive impact, I believe, on the faculty as a whole. We have evaluated our own practices more regularly and have given the students opportunities to give their feedback too.'*
- *'Formal team meetings were not needed regularly, rather informal discussions regarding what was working well within each class occurred regularly. The school's new learning management system, Connect, allowed unit pages to be created to ensure both staff and students had access to all resources. This maintained consistency across classes, as well as provided support for non-specialised Geography teachers. The school also supported applications for Professional Development for teachers to continue to improve their teaching practices.'*
- *'The Improvement science model promoted the development of the historical thinking in units. For example, all units were given a 'generative title' and a course 'throughline' was identified. Specific Historical Thinking concepts were aligned with generative titles and throughlines. This was a practice that was established in 2016 amongst the year 9 History teaching team. This provides evidence for a cultural change around planning and programming units of work at a team level and developing at a faculty level. Program and units of study were carefully structured using a backwards planning model, thinking skills*

and historical thinking concepts were identified next and only then was content chosen and mapped to the concepts and historical problems identified in essential questions. This reflects a change in the approach to planning and writing units of work in this faculty where before content remained the focus of planning and lessons. The benefit for students of this change in emphasis was immediate this year. Year 10 students were not overwhelmed with content and became more engaged when presented with historical problems, requiring reasoning and the co-construction of their knowledge.'

- *'Further evidence for this cultural change in planning was seen in teaching and learning strategies. This likewise had the impact of enhancing student resilience agency. For example, the Year 10 History team created templates for note making using the Cornell Scaffold for note making. Students were given direct instruction in using this method effectively; they were given sources for historical inquiry with scaffolding that highlighted critical thinking. The approach was consistently applied to the whole cohort. The practice of beginning lessons with hooks and stimulus was a strategy that was continued throughout 2017; clear lesson intentions were established at the outset of lessons and students were encouraged to focus on developing the skill of concise TEE paragraph writing showing the integration of evidence from sources and own knowledge.'*
- *'In order for students to benefit and utilise feedback provided, it was decided the type and style of feedback should be redeveloped to ensure consistent and more meaningful feedback. The team developed a tool to allow for self-reflection prior to the submission of tasks which also integrated teacher feedback, with a focused on student improvement. The Social Science Evaluation Sheet has been adopted by all members of the faculty to provide meaningful feedback.'*

2. Improved pedagogy

Teachers also reflected on their own practice and the second theme which emerged was the way in which the team focus on pedagogical approaches had helped them grow as teachers. Reflections included references to the consistency and intentionality of their approach throughout the project and these were aligned with the practices set out in the iterative plan-do-study-act cycles. Sample responses are included below.

- *'In order to achieve our aim, it was vital teachers employed effective teaching strategies that engaged students. Simple strategies such as using provocations and hooks for each lesson and renaming topics and tasks would aim to heighten student interest and allow for a new dialogue in the study of Geography. This was achieved through the re-development of programs and lesson sequences and giving students access to these sequences.'*
- *My teaching has been more intentional and explicit*
- *Overall, the research project made individual and team teaching practices more purposeful, explicit and consistent. Skill development of students was the focus as well as engagement by designing learning experiences that were relevant to them.*
- *The tight focus on historical concepts and historical problems of the past has helped me to plan effective lessons that privilege thinking and puzzling through ideas and alternative perspectives over lower order recall of facts. This has contributed to students learning how to trust their instincts which I believe contributes to resilience agency.*
- *The AIS Research project has had a significant impact on my teacher practice. I have been able to develop and consolidate my teaching and learning practice, ensuring I am consistently explicit in my approach and that I work to find strategies that will help students to develop resilient agency in their learning. Through hooks and clear learning goals, I am have become more explicit in my teaching. Further, I am able to identify the learning needs of students and to develop teaching and learning strategies that help students to articulate certain historical concepts and meta-language or source analysis skills.*

- *The AIS Project has given me the time and impetus to reassess the way I approached Year 9 Mandatory History. Understanding of middle school learners meant that I was ready to make changes believing that the students would enjoy the subject more if topics were approached differently*
- *The research project has led to more consistent and purposeful teaching practices within the 2016 and 2017 Year 9 Geography teams. Release time has allowed teams to create new programs, reflect and analyse data, and re-program (PDSA cycle) to continue to improve student learning. This has resulted in learning experiences which focus on enhancing student outcomes and resilience by providing opportunities to engage in risk taking and inquiries that are relevant to the future workplaces and as current global citizens.*

3. Improvements in students' knowledge and skills.

All teachers noted the developments in students' knowledge and skills as a result of the approaches taken by the faculty. Teachers explicitly referenced the impact of the intentional and consistent practices on student learning. They referred to specific skills which they had seen develop in examinations and assessment tasks.

- *In 2017 I was part of the Year 10 History team. This is the same cohort that experienced the practices and interventions introduced in 2016 as part of the AIS project. This group was well placed to continue to develop the historical thinking skills and metalanguage that was highlighted in the action research model introduced by the Year 9 teachers last year.*
- *This year, we continued to use hooks and learning goals in Year 10, these explicit teaching strategies became routine in Year 9 and the current Year 10 students have continued to understand the connection between the essential questions and goals at the beginning of the lesson. It provides a useful frame and a target for their understanding.*
- *'In the recent examination responses, it was apparent that our students were more confident in dealing with Source-based questions, including those asking about reliability*

and usefulness which are higher order. Whilst not all students mastered these, many responses were very pleasing; some were like Year 11 Modern History responses. The teaching of explicit source analysis skills has seen improvements. It was also encouraging to note in the extended responses, how many students referred to concepts (such as contestability, when discussing the Anzac Legend) in their answers. Many used terms and concepts competently, to a level that we have not seen or required previously.'

- *The teaching of explicit source analysis skills in Year 9 has seen some improvements in Year 10 historical literacy. While some students continue to struggle to extract relevant information or comment on the reliability of sources, students are able to articulate their issues with source analysis and to point to particular concepts that they do not understand. This suggests that the explicit teaching of historical literacy in source analysis is helping the student to articulate their problems with source analysis and their understanding of historical concepts.*

4. Importance of consistency within faculty teams

Though only two teachers referred explicitly to the change within the teams over the two year period, this was worth including given the impact this had on the research project. Due to staff attrition, the Geography team lost three of its original teacher-researchers at the end of 2016.

- *With new staff members forming part of the 9 Geography team this year, it was essential the 2016 Driver Diagram was modified to reduce the number of change items we were going to implement. This was decided to ensure effective interventions could be adopted by all and remain consistent across the cohort.*
- *Over the two years the team has changed significantly. It would have been good (desirable for the project) to have had more consistency.*

Figure A: Geography Team summative reflection on key changes to practice over 2015-2016.

2015	2016
Scope & Sequence / Program - No explicit explanation of teaching and learning strategies for teachers to employ - No evidence of varied teaching strategies - Little evidence of integration of geographical skills - SS suggests 4 different assessment tasks (only 2 occurred) Why? - Program cover not true reflection of program contents	- Scope and sequence constructed in consultation with whole team - Outcomes for each lesson with each cycle provided - Staff responsible for development of teaching and learning strategies identified -Scope and sequence was a working draft and was readjusted following fortnightly evaluations (many lessons were missed due to unavoidable interruptions) -Flexibility of SS and staff collegiality allowed for changes to occur within the term
Assessment - Little variation in assessment: 2 written tests with same structure (disadvantages students who suffer from 'exam anxiety') - Questions are not higher order (little variation of directive terms) - Students not given opportunity to show extensive understanding of content - Unrealistic expectations of student responses (allocation of marks and lines provided not appropriate to question being asked)	- Great variation in assessment allowing students to achieve on a variety of platforms eg staggered submission, group and individual components of learning module, reflection under examination conditions - Higher order directive terms used to encourage students to achieve at a higher level and begin to enhance their written communication in preparation for senior years - Glossary of directive terms provided in reflection -Student ownership allowed for meaningful and purposeful assessment (choice of case studies and activities to include in case study) - Content assessed in reflection matched what was required in module
Staff Collegiality - Recommendations to modify assessment not considered - 'Red folder' process not adhered to - Little organisation and communication between teachers therefore different learning experiences resulted (unfair assessment) - One marker of exam (inconsistent awarding of marks)	- Regular time scheduled to meet - Lesson aims and outcomes developed and followed by whole team - Creation of lessons divided (allowing students to experience different teaching styles) - Marking of reflections divided into sections to ensure consistency of marks, distributed work load and consistent feedback - Pilot marking occurred (more could have occurred)

Figure B: History Team summative reflection on 2016.

TERM 3 History Teacher Reflections on the Year 9 AIS project

2016 - What have we done differently?

This year the Year 9 History team focused on employing helpful learning practices in Year 9 History. As a group we focused on 'good teaching practice'. We ensured that we more intentional; more explicit and more relevant in our lessons. Further, we tried to be more consistent in lesson structure and more transparent (what we're doing and why). In addition, we encouraged students to take responsibility for their own learning, to try and reduce their 'fragile dependence' .

How did we try to implement these changes into the programme?

1. We 'played with' the Depth Studies in the Stage 5 Syllabus and changed the usual pattern to make it more relevant for the students. Splitting the Depth Studies allowed us to trace a topic from the C19th through to current day
   Eg. Yr 9 Movement of Peoples (Australia and America)
   Yr 10 Rights & Freedoms (Australian & American Civil Rights, 1950's - today)
   Why do this? An attempt to get students to see the relevance by bringing each topic up to the current day. eg.
   - For Movement of Peoples, we used the Syrian refugee crisis
   - For The Slave Trade, we used examples of slavery today
   - For American Civil Rights, we used The Baltimore riots and recent examples of violence. Donald Trump. Tributes to Muhammed Ali.

2. We determined some teaching strategies that we'd all use
   - Hooks – lesson starters – means of explaining currency/relevance and means of gaining initial engagement
   - Visible Thinking Routines such as 'See, Think, Wonder'
   - Goals – what were we hoping to achieve in the lesson (Did we achieve these?)

   Essential questions – 'big' questions rather than a narrower content focus; promote thinking. We were explicit with these.

3. Developing historical literacy
   - Out approach to source study was influenced by (D. Mootz's scaffold)
   - Increased use of historical terms; students to have greater familiarity with syllabus terms – concepts, glossary. Syllabus glossary used as a pre-test.
   - We also decided to make a film study a feature of each term (1. Rabbit Proof Fence, 2. The Help, 3. Gallipoli). We used these films as a source to be interrogated.
   - Learning portfolio (samples of student work) – formative tasks – small, manageable. Evidence of skills being acquired and concepts being covered. Checklist. This was our data collection as we had no formal Assessment Task.

Research Question 2 - What is the impact of using improvement science as a model of professional learning on student learning experiences?

The survey 'What is your experience as a student' was implemented with Years 9 in November, 2015 to provide baseline data on students engagement with the teaching and learning practices used within the respective Year 9 courses. This survey produced both quantitative and qualitative data. Through the improvement science model, teacher-researchers chose Question 14 as a means of testing, on a termly basis, whether their practices had indeed improved, consistently. Below is a graph indicating the responses to Question 14 from Year 9 students from 2015 and 2016, regarding helpful teaching practices within subject areas. Noticeably, in Mandatory Geography and History, the subjects in which the Improvement Science intervention had taken place, there is significant growth in the Year 9 student perception of helpful teaching practices evident within these courses. This is contrasted with control mandatory subjects A, B and C which did not experiences the Improvement Science intervention and did not experience the same level of growth, in fact two of these mandatory subjects saw a decrease (see Figure C). In the term by term response to this same question over 2015-2017 (see Figure D), it is evident that the History faculty were able to establish and sustain this improvement to teacher practices whilst the Geography team experienced significant decline in 2017. This was at the same time as staff attrition within the team and changes to the Geography syllabus.

Figure C

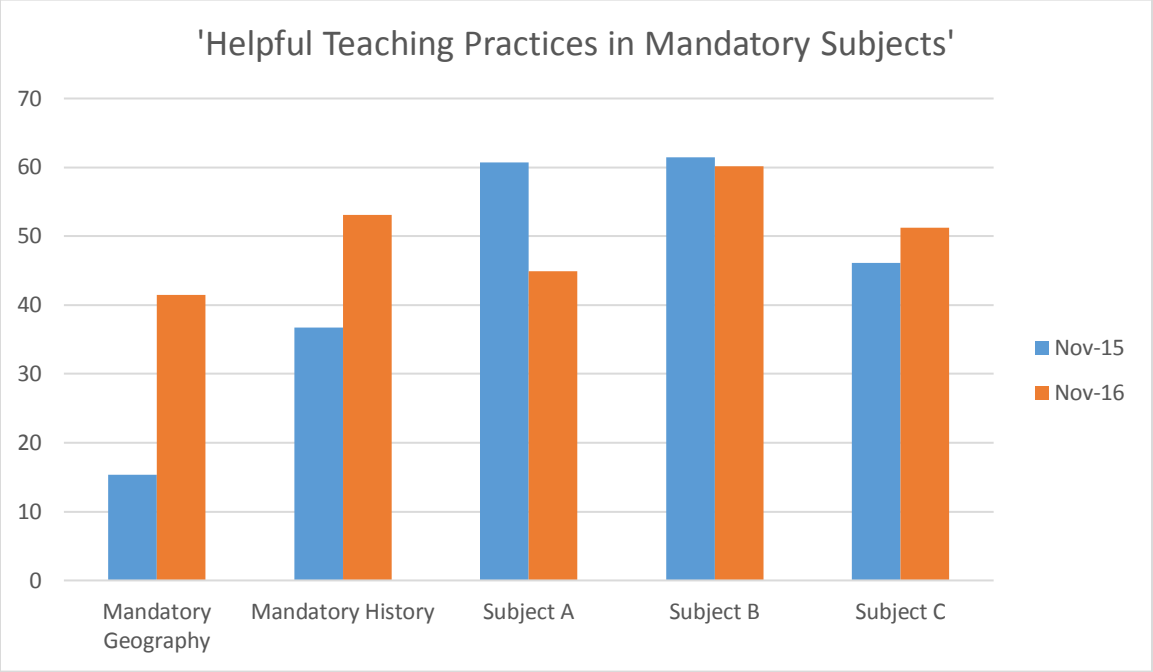
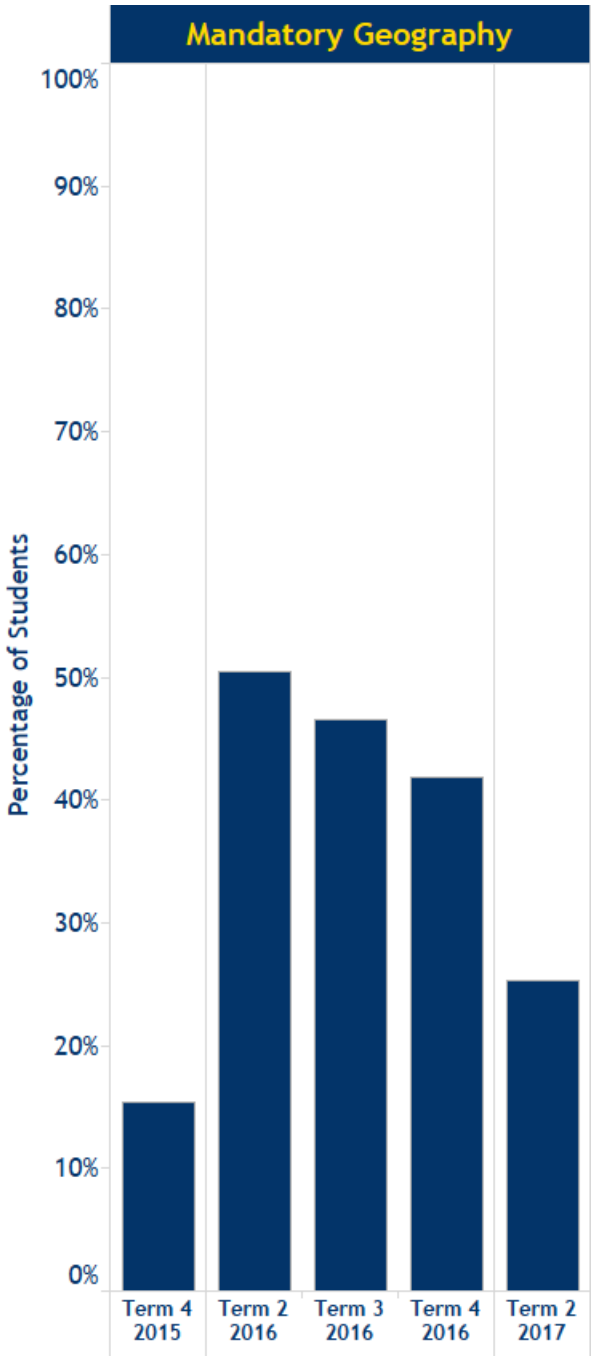
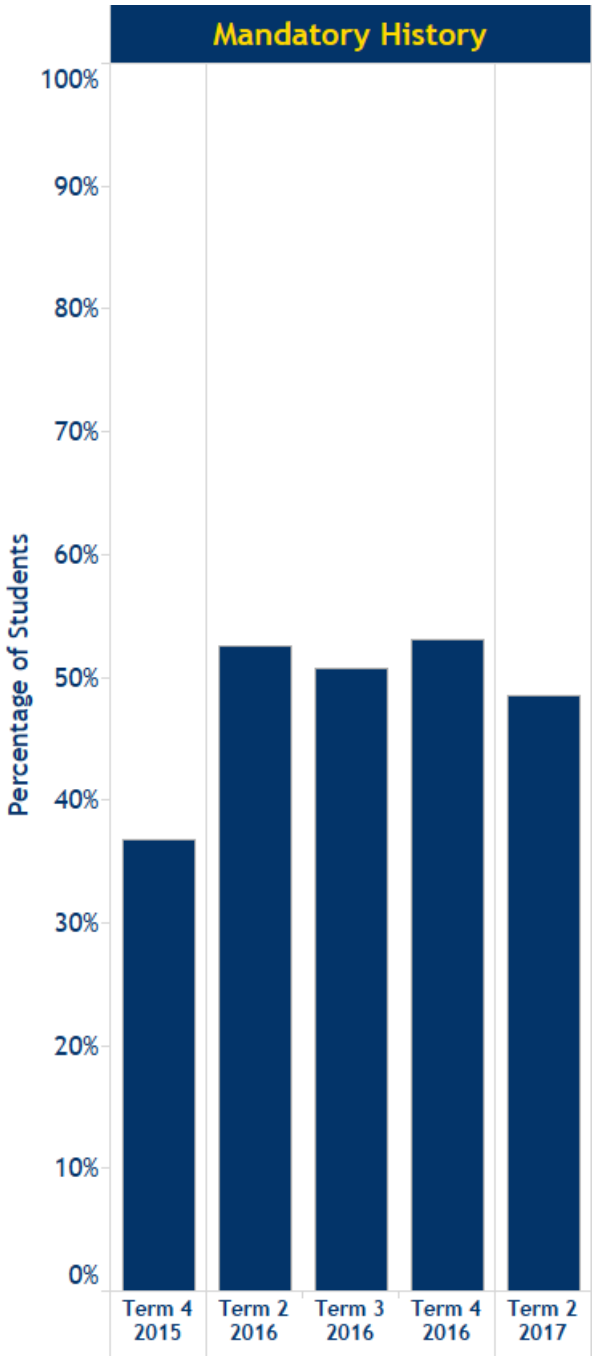


Figure D – Year 9 Cohorts from 2015 – 2017 response to Question – 'In which subjects do helpful teaching practices occur the most (as many subjects that apply).'


Mandatory Geography
Percentage of Students
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Term 4 2015
Term 2 2016
Term 3 2016
Term 4 2016
Term 2 2017


Mandatory History
Percentage of Students
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Term 4 2015
Term 2 2016
Term 3 2016
Term 4 2016
Term 2 2017

Research Question 3. What are the teaching and learning practices and/or interventions that may lead to the development of students' resilient agency?

As outlined, resilient agency refers to student awareness, ownership and responsibility for learning. In order to develop resilient agency in Year 9 students, teacher-researchers in both History and Geography devised intentional pedagogical approaches over three 'intervention cycles'. Teaching and learning programs were devised in Term 1, 2016 for Terms 2 and 3 in 2016, with a focus on building students' resilient agency. Practices, including student-led enquiry, explicit use of learning goals, development of learning hooks and a metalanguage for learning, were all devised with the intention of growing student awareness, ownership and responsibility for learning, and reducing dependence on the teacher.

	Geography	History
PDSA Cycle 1, Term 2 2016	Group student-led enquiry learning	Lesson Goals / Hooks WWI Immersion Learning Portfolios
PDSA Cycle 2, Term 3, 2016	Explicit Teaching of Skills / WALTS Learning goals	Lesson Goals / Hooks Historical Literacy / Metalanguage
PDSA Cycle 3, Term 2 2017	Inquiry Learning	Lesson Goals / Hooks Historical Literacy / Metalanguage

Baseline data of students' resilient agency was captured using the online CLARA survey tool at the beginning of Term 2, 2016 and again in Term 4, 2016, after the two terms of intentionally designed practices in Year 9 Geography and History lessons. This tool creates a profile which students and teachers were able to interpret using the 'My Learning Power' booklet (Learning Emergence, 2016). Professor Ruth Deakin Crick and her team at Learning Emergence completed the analysis of the online survey data and key findings from the report are outlined in Figure E and Table B below.

Figure E – Year 9 students' responses to the CLARA tool, May and November, 2016.

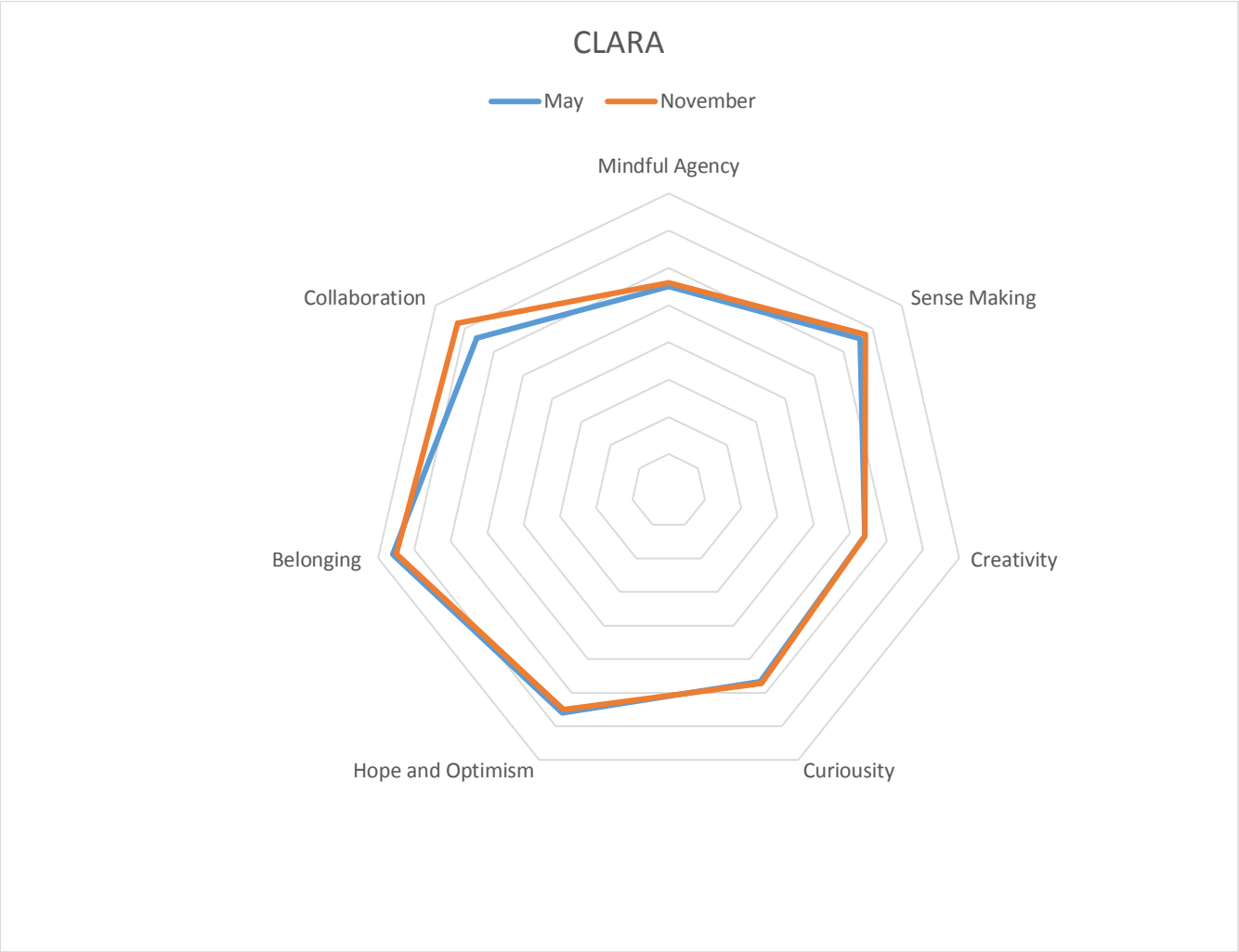


Table B: Compares the score distributions in the first and second assessment of this group.

CLARA Dimension	Assessment	Mean	S.D
Mindful Agency	May	55.13	16.89
	November	56.06	17.52
Sense Making	May	65.66	12.57
	November	67.54	15.66
Creativity	May	54.81	18.07
	November	54.26	19.80
Curiosity	May	56.64	21.27
	November	57.29	19.82
Hope and Optimism	May	66.37	22.12
	November	65.07	20.91
Belonging	May	76.23	25.12
	November	74.80	27.47
Collaboration	May	66.88	26.07
	November	72.39	23.99

After two cycles (Terms 2 and 3 2016) of interventions in History and Geography lessons, students demonstrated slight growth in their Mindful Agency (55.13 to 56.06), Sense Making (65.66 to 67.54) and Curiosity (56.64 to 57.29) and a more significant growth in their Collaboration (from 66.88 to 72.39). An overview of each of these dimensions of the CLARA tool are provided below.

Collaboration

- how you learn through your relationships with other people
- knowing who to turn to for help and advice]solving problems by talking them through with others
- generating new ideas through listening carefully, making suggestions and responding positively with feedback.

Sense Making

- making connections between ideas, memories, facts – linking them and seeing patterns and meaning in them
- being able to create a 'knowledge map' of what you're learning
- how learning matters to you, connecting with your own story

Mindful Agency

- taking responsibility for your own learning
- knowing what you want to achieve and why
- knowing how to go about it; stepping out on the pathway towards your goals.

(Crick et al., 2015)

Teacher reflections on students' resilient agency

Through written reflections, teachers provided their perceptions on students' growth in resilient agency at the conclusion of each intervention. Reflections were analysed, looking for references to growth in responsibility, awareness and ownership of learning. Sample responses are included below.

- '*The most significant change that I have observed in my students is that they are able to articulate learning goals, historical literacy concepts and are generally more engaged in their own learning'*
- *'The most significant change that the four teachers have noticed since taking on this 'Improvement Science' project has been the level of student engagement. This is evident from discussion in lessons and in student comments in their evaluations at the end of term. They, mostly, like what we are doing and have an understanding of why we are doing it. Students come to class expecting to start the lesson with a 'hook', whether is an essential question or a recent article or YouTube clip. Most seem to be interested in the topics being covered, particularly once made relevant and topical…. Students now expect the lesson goals to be explicitly stated and know that this occurs in across all classes.'*
- *Students were given a task before the exam which was based on the 2017 Simpson Prize question. Teachers provided scaffolding and sources students to help them with the essays*

and research. However, they were expected to conduct some of their own research on the battles and to select appropriate sources which would support their argument. This encouraged them to be independent leaners and to apply their knowledge of the battles in order to deal with the historical concepts (ie contestability). The onus was placed on the students to apply themselves and develop both their knowledge, concepts and skills in preparation for the exams.

- *As a consequence, there seemed to be less 'fragile dependence' and more responsibility for their own learning in the pre-examination period. After the examination they could see the connection between the preparation and that this task had helped and that they could take this approach to study and preparation into Year 10 History. Further, the responsibility for conducting their own learning, and the learning of others, was observed on World War I Immersion Day. Knowing that each small group was responsible for the running of a session and the dissemination of information to their peers saw considerable effort and thought being employed.*
- *After three terms of following the teaching and learning strategies, students became more independent in terms of making notes without teacher promoting; analysing sources in a critical manner in peer situations, while teachers simply facilitated discussions.*

Discussion

The overall aim of this project was to explore improvement science as a framework for professional learning. The project leaders hoped this methodology would lead to improvements in teacher practice, specifically, practices aimed at developing the resilient agency of Year 9 students. Throughput 2016 and 2017, teachers participated in a series of professional learning activities, following the principles of improvement science, to design interventions within the Year 9 History and Geography courses.

It is clear through the teachers' written reflections that the improvement science model of professional learning was effective in changing teacher practice, at a faculty and individual level. Teachers predominantly felt that this framework allowed for increased collegiality within the respective faculties, as well as consistency within the team, in regards to the intentional approach to teaching and learning within their classrooms. Additionally, teachers felt that the protocols guiding their disciplined inquiry led to improved learning experiences for students. These reflections were supported by students' responses to the 'touch point' question from the Wiggin's survey regarding students' perceptions of helpful teaching practices within their various subjects. Three cohorts of Year 9 students were asked to respond to their experience of learning within their subjects. It is clear from the results that in both Mandatory History and Mandatory Geography courses, the only two faculties who experienced the improvement science intervention, that there was a significant increase, between 2015 and 2016, in students' responses when compared with the three other mandatory subjects. Though these are two different cohorts, it is important to note that the curriculum requirements were exactly the same, it was the intentional approach to teaching and learning that had changed.

Whilst the students' responses to their experiences in History rose significantly from 2015 to 2016, and were then sustained into 2017, for the Geography team, significant initial gains were followed by a slight drop in student response throughout 2016. In 2017, with significant teacher attrition and changes to the syllabus, the Geography team were not able to sustain the growth experienced in 2016. Importantly, moving forward with the improvement science methodology,

some of the teachers' reflections also indicated that there was a sense of disappointed experienced due to changes to the research team. Whilst teacher attrition and yearly changes to grade level teams are a natural occurrence within a school, this proved challenging within a two year project in which much of the professional learning had occurred within the first year. New team members lacked the knowledge and sense of personal investment gained through engaging in the improvement science protocols in the first six months of the project. This finding is pertinent to any form of change management or improvement project, in that it is essential to effectively induct all new members to ensure team priorities are aligned.

While we cannot claim causality, there is an alignment between the teachers reflections regarding developments in students' responsibility, awareness and ownership of learning throughout 2016 with the growth in student resilient agency as measured by the CLARA survey tool. The interventions designed by both History and Geography teams, with a focus on group work in student led enquiry, development of metalanguage, explicit understanding of learning goals and increased responsibility through individual learning portfolios align with the descriptions of those dimensions of the Crick Learning for Resilient Agency tool which did improve.

As a small study, there are obvious limitations to the findings from this research. However, the results are promising for schools wishing to explore new methodologies for creating and sustaining improvement. Additionally, it was clear to the team of teacher-researchers that it is possible to have an effect on students' resilient agency through an intentional approach to educational experiences which foster the dimensions of this construct.

Conclusion

Through this study, the teacher researchers were able to note a positive impact to both teacher practice and student learning experience through engaging with the improvement science framework for professional learning. This was supported by Year 9 students' responses to the Wiggins' survey which captured their self-reported experiences of the Year 9 Mandatory History and Geography course. Additionally, through this intentional approach to improvement, teachers believed they were able to develop and implement practices which contributed to the growth in students' resilient agency. This perception was supported by the growth in resilient agency as measured by the CLARA tool.

Research to Practice Impact

Impact at Ravenswood School for Girls

Participation in the AIS School Based Research Project has significantly impacted educational and professional practice at Ravenswood School for Girls. One key aspect of Improvement Science is that educators can accelerate their learning through 'networked communities'. It was always the intention that this research project would eventually lead to a growth in the collective capacity of the academic staff. Involving Stage 5 Mandatory History and Geography teachers provides access to the whole cohort of Year 9 students. At Ravenswood, Geography teachers are members of the Social Science faculty and History teachers are members of the History faculty. In the absence of an integrated HSIE faculty, there has been little impetus for cross faculty collaboration in the two departments. The Coordinators and teachers were keen to work more closely and the funding support has provided the staff time to collaborate in meaningful ways. It was hoped that this would then expand to Year 9 and 10 Mandatory History and Geography teachers in 2017 and then the wider School academic staff in 2018.

However, at the beginning of Term 3, 2016 Year 9 History and Geography team leaders were able to present to all Ravenswood staff the significant progress made throughout Term 2, notably the impact of utilising the disciplined inquiry promoted through Improvement Science (See Image X). The response to this presentation was overwhelmingly positive with many staff expressing an interest in the methodology. As a result of this groundswell of interest, it was decided that the methodology would be introduced at the Middle Leaders Retreat early in Term 3, 2016. The Improvement Science methodology was used to examine data gained from School Exit Surveys at Years 6, 9 and 12 over the past three years. Middle Leaders, including all Heads of Department and executive staff members applied the tools of systemic analysis to this data in order to see the system that had led to these results (see Image X). The pattern of initial defensive response followed by active involvement and proactive planning was witnessed by facilitators. Once again, the product of this rigorous work resulted in the development of an Aim Statement regarding the consistency of quality teaching and learning practices across the School and it was decided at this retreat that we would engage all Ravenswood staff in a disciplined inquiry. This work has

developed throughout Term 3 and 4, 2016 at both Teaching and Learning and Staff Meetings, culminating in an extensive session at the Professional Learning Day on October 10th (see Image X). This work resulted in a whole school 'Driver Diagram, (see Appendix X) and 'change items' for each faculty to develop into Plan-Do-Study-Act cycles throughout 2017 (see Appendix X).

Image X. Term 3, 2016 – Staff Professional Learning Day.
Teacher-researchers from AIS project present to whole staff.

Image X – Term 3, 2016 Ravenswood Middle Leaders Retreat.

Middle Leaders engaging with improvement science principles and tools to address quality of teaching and learning experiences in the secondary school.

Image X. Term 4, 2016. Ravenswood Professional Learning Day.

Teacher-research from AIS Project leads table discussion for whole school improvement project using improvement science principles and tools.

Sharing our learning with the wider community

In our original application we aimed to eventually share our practices with other schools across sectors and internationally. This aim was reached within the first year of the project in three significant ways. Firstly, project leaders were invited by our 'critical friend' Professor Ruth Deakin Crick to present the overview of the project and initial work with Improvement Science at a NIC@CIC evening (see image X). Secondly, members of the research team were invited to share the process and outcomes of utilising the Improvement Science methodology at the AIS Education Research Symposium, October 2016. At this symposium, members of the team presented to delegates on the application of Improvement Science in a School Setting, outlining the practical applications of the methodology. Thirdly, in March 2017, Mrs Terrie Jones and Ms Amy Van Arkkels presented at the fourth annual Carnegie Foundation Summit on Improvement in Education in San Francisco (See Images X and X). This international conference provided avenues for continued learning in the fields of systems and quality improvement as well as the opportunity to showcase the rigorous, disciplined inquiry being undertaken at Ravenswood School for Girls. In line with the emerging literature regarding Networked Improvement Communities (NIC), Ravenswood maintains the intention to lead a cluster of schools who are similarly concerned with the ongoing improvement of teaching practice.

Image X – Sharing learning with the wider community. May, 2016.

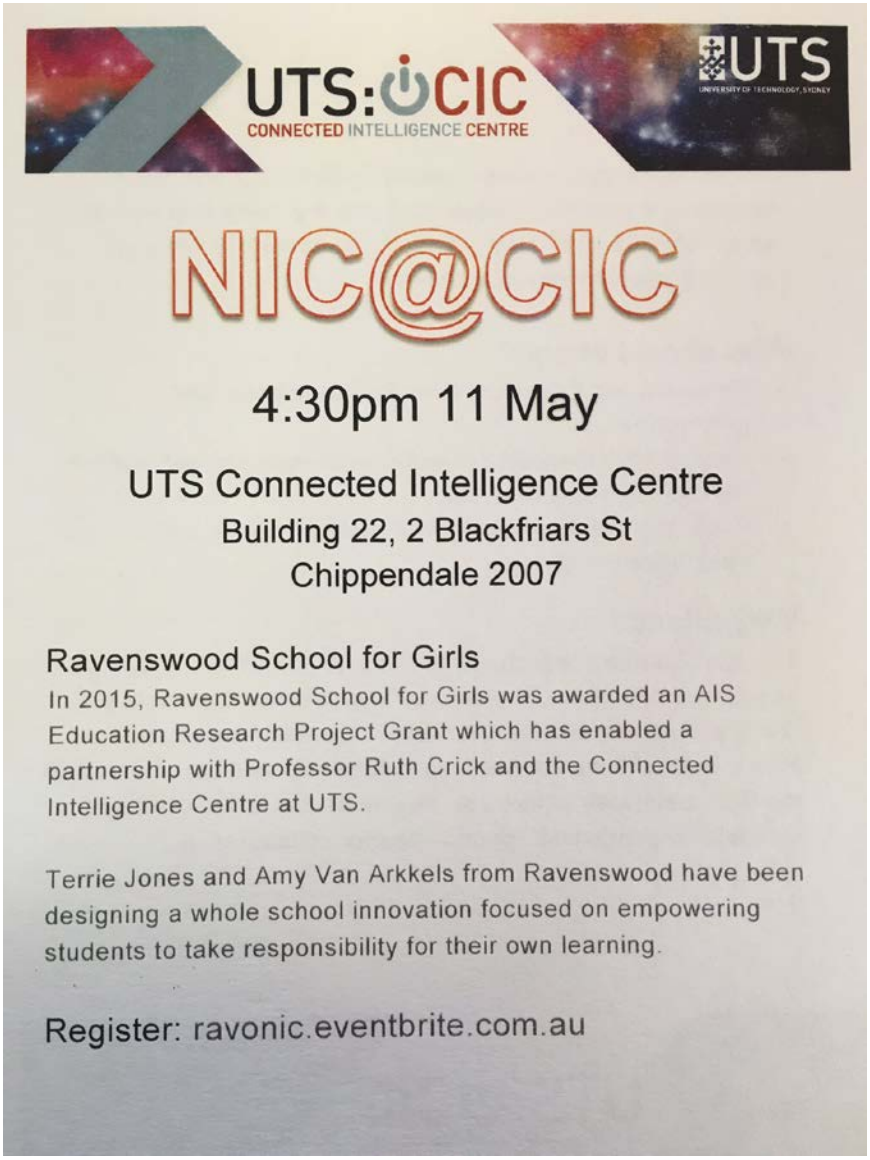
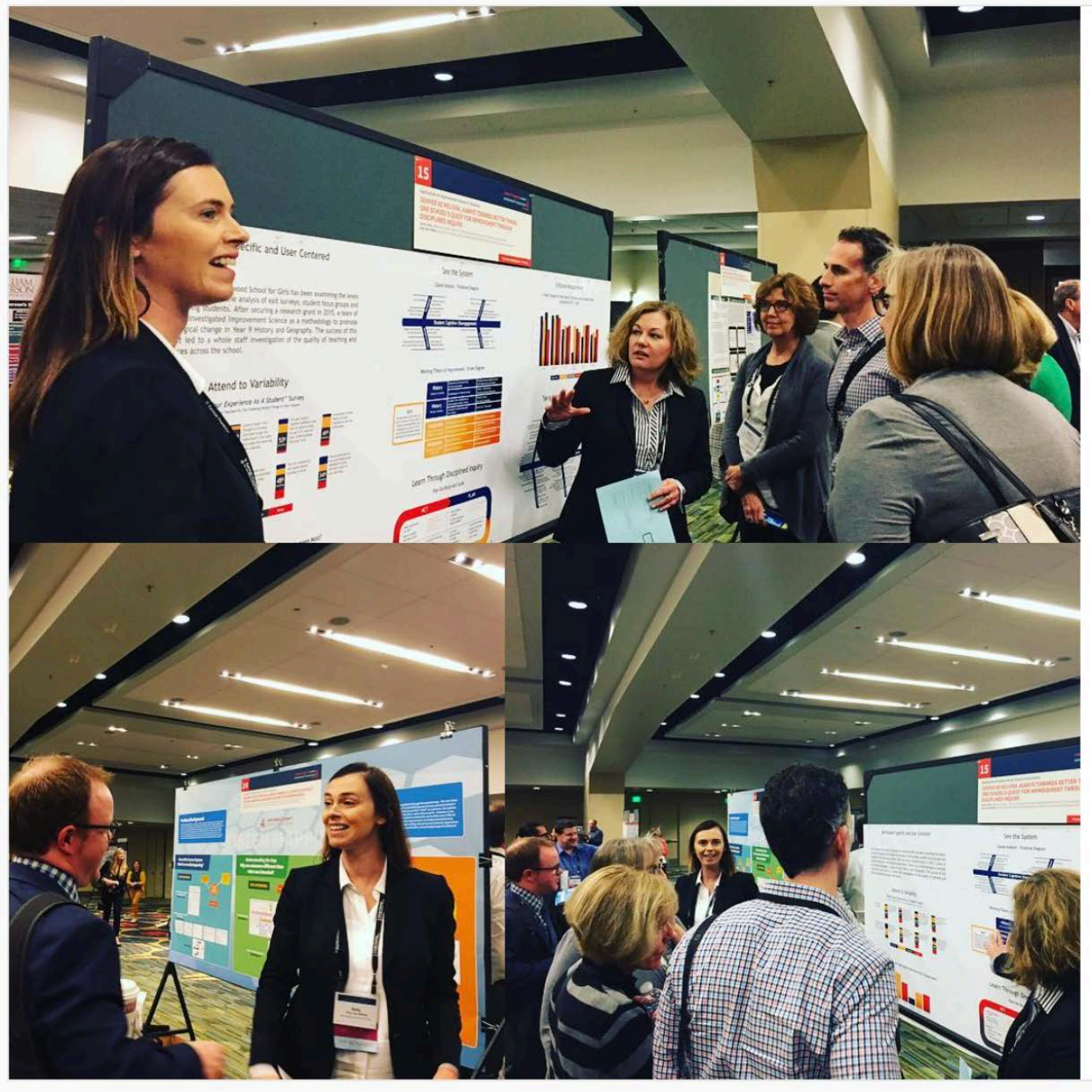


Image X. Sharing learning with the wider community.

Project leaders share application of Improvement Science at school level at the Carnegie Foundation Summit on Improvement in Education in San Francisco, March 2017.



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