STEM, STEAM or HASS?
INTERROGATING MODELS OF CURRICULUM INTEGRATION
### Friday 14 October 2016

<table>
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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>9.00am</td>
<td>Welcome and introductions. Associate Professor Judy Anderson, ACSA President</td>
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<td>Welcome to Country</td>
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<td>Official welcome</td>
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<tr>
<td>9.15</td>
<td>KEYNOTE 1</td>
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<td></td>
<td>Examining models of curriculum integration (20 minutes each). Chair, Associate Professor Judy Anderson</td>
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<td></td>
<td>1. STEM: The perils and rewards of interdisciplinarity. Professor Russell Tytler, Deakin University</td>
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<td>2. STEAM: Creativity as the innovation literacy. Professor Michael Anderson, University of Sydney</td>
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<td>3. HASS: Is deep learning ‘the elephant in the room for integration’ in the Humanities and the Social Sciences? Associate Professor Deborah Henderson, Queensland University of Technology</td>
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<td>Respondent—Professor Robyn Ewing, University of Sydney</td>
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<td>Questions and reactions from the audience</td>
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<td>10.45</td>
<td>MORNING TEA</td>
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<td>11.15</td>
<td>WORKSHOPS SESSION 1</td>
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<td>Ante Room</td>
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<td>Creating new solutions — using design thinking</td>
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<td>Donna Loughran, Doonside Technology High School</td>
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<td>1. STEAM: The synergy of six. Nicole Morton Xavier High School, NSW</td>
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<td>2. Teaching STEM: Flipped, electives or integration? Kathy Harris, Independent Schools Queensland</td>
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<tr>
<td>12.00pm</td>
<td>Move to next workshop</td>
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<td>12.05</td>
<td>WORKSHOPS SESSION 2</td>
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<td>Ante Room</td>
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<td>Riding the rollercoaster</td>
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<td>Dr Charlotte Forwood and Geoff Little, Strathcona Baptist Girls Grammar School, Melbourne</td>
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<td>1. STEAM into STEM: Linking to the Australian Curriculum. Grant Smith, Everton Park State High School and Dr David Nutchey, Queensland University of Technology</td>
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<td>12.50</td>
<td>LUNCH</td>
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### FRIDAY 14 OCTOBER 2016

#### 1.30  MASTERCLASS SESSION 1

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<thead>
<tr>
<th>Time</th>
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<td>1.30</td>
<td>Ante Room</td>
<td>A learning design platform created by teachers, for teachers</td>
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<td>Lodge Room 2</td>
<td>Transforming schools: Creativity, critical reflection, communication and collaboration</td>
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<td>Composite Room</td>
<td>Integrating education for sustainability into civics and citizenship education</td>
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<td>Corinthian Room</td>
<td>Year 7–8 STEM ed: It really is rocket science</td>
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<td>Carrington Room</td>
<td>Moving beyond a diary entry of a fallen soldier: Integrating history and civics in F–6 HASS</td>
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<td>Tuscan Room</td>
<td>STEM Integration Stage 4</td>
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<td>Steve Collis, Northern Beaches Christian School</td>
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<td>Professor Michael Anderson, University of Sydney and Dr Miranda Jefferson, 4C Transformative Learning</td>
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<td>Associate Professor Libby Tidball, Monash University and Associate Professor Deborah Henderson, Queensland University of Technology</td>
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<td>Michael Nightingale, Mount Annan Christian College</td>
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<td>Dr Mallihai Tambyah, Queensland University of Technology</td>
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<td>Nagla Jebeile and Vatche Ansourian, Department of Education, NSW</td>
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#### 3.00  AFTERNOON TEA

#### 3.20  WORKSHOPS SESSION 3: Engagement with other organisations

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>3.20</td>
<td>Composite Room</td>
<td>Shifted thinking: New school–museum learning</td>
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<td>Lodge Room 2</td>
<td>Teaching creativity</td>
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<td>Ante Room</td>
<td>Putting the A in STEAM</td>
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<td>Tuscan Room</td>
<td>Want a STEM professional in your classroom, why wouldn’t you?</td>
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<td>Carrington Room</td>
<td>Drama, literature and literacy in the primary classroom</td>
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<td>Corinthian Room</td>
<td>Exploring hands on multidisciplinary STEM with Arduino Esplora</td>
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<td>Peter Mahony, Museum of Applied Arts and Sciences</td>
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<td>Frank Newman, Sydney Opera House</td>
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<td>Leanne Carr, Art Gallery of NSW</td>
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<td>Joel Cowey, CSIRO</td>
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<td>John Nicholas Saunders, Sydney Theatre Company</td>
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<td>Dr Abelardo Pardo, University of Sydney</td>
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#### 4.00  PANEL SESSION 1

Integrated curriculum to meet the needs of diverse learners. Chair, Dr Kevin Lowe
Assistant Professor Phillip Roberts, University of Canberra
Dorothy Hoddinott, Principal, Holroyd High School
Professor Emeritus Alan Reid, University of South Australia
Questions and comments from the audience

#### 5.00–6.00  PRESIDENT’S RECEPTION: Canapes and drinks

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## PROGRAM

### SATURDAY 15 OCTOBER 2016

**9.00 am  KEYNOTE 2**

Grand Lodge  
Curriculum integration: What could it look like? What would it take?  
Chair, Associate Professor Deborah Henderson  
Dr Nicole Mockler, University of Sydney  
Questions and reactions from the audience

**10.00**  Move to workshop

**10.05  WORKSHOPS SESSION 4**

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<tr>
<th>Lodge Room 2</th>
<th>Composite Room</th>
<th>Corinthian Room</th>
<th>Carrington Room</th>
<th>Tuscan Room</th>
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<tbody>
<tr>
<td>Making the change from project-oriented learning to project-based learning</td>
<td>Game on—the role of game mechanics and online resources in cross-curriculum teaching and assessment</td>
<td>Using ‘real world’ contexts to bring interdisciplinary learning to life</td>
<td>Promoting pre-service teachers’ STEM learning through collaboration between education, mathematics, and science</td>
<td>How does your garden grow? Cultivating the curriculum with STEM</td>
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<tr>
<td>Jake Plaskett, Rosebank College</td>
<td>Bill Cohen, Asquith Girls High School</td>
<td>Dr Carly Sawatzki, Monash University</td>
<td>Professor Joanne Mulligan, Macquarie University</td>
<td>Kirstin Beck, Alstonville Public School</td>
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**10.50**  MORNING TEA

**11.15  MASTERCLASSES SESSION 2**

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<tr>
<th>Tuscan Room</th>
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<tr>
<td>Making the seemingly impossible possible with HPC and PBL in K–12 contexts</td>
<td>Curriculum integration: When I get a minute!</td>
<td>Creating significant learning experiences through PBL</td>
<td>Intercultural competence for 21st century learners: Integrating curriculum in primary school</td>
<td>Curricula integration revisited in K to 6</td>
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<tr>
<td>Dr Jane Hunter, University of Technology, Sydney; Bianca Hewes, Northern Beaches Secondary College and Lee Hewes, Merrylands East Public School</td>
<td>Dr Debra Talbot and Dr Nicole Mockler, University of Sydney</td>
<td>Jake Plaskett, Rosebank College</td>
<td>Associate Professor Ruth Reynolds, University of Newcastle</td>
<td>Vilma Galstaun, University of Sydney</td>
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**12.45 pm  LUNCH**

**1.15  FINAL KEYNOTE**

Grand Lodge  
A question of impact? Curriculum, aspirations, and collaboration. Chair, Cameron Paterson  
Professor Jenny Gore, University of Newcastle  
Questions and reactions from the audience

**3.00**  Close
Topic 1. STEM: The perils and rewards of interdisciplinarity

STEM in Australia has morphed from a term denoting a broad area of study to a watchword for interdisciplinary curriculum practices. STEM is looked to for engaging students in collaborative reasoning and authentic problem solving. Yet the effectiveness of STEM as an interdisciplinary curriculum has been questioned. In this presentation I will raise questions about the nature of disciplinary reasoning and interdisciplinary practices, and the relation between STEM curriculum practices and research and development in STEM, in order to explore potentially productive models of interdisciplinary STEM and the conditions under which disciplinary curriculum interests might or might not be served.

Russell Tytler is Professor of Science Education at Deakin University. He has researched and written extensively on student learning and reasoning in science, and pedagogy and teacher and school change. Russell also researches and writes on student engagement with science and mathematics, school–community partnerships, and STEM policy.

Topic 2. STEAM: Creativity as the innovation literacy

Creativity is the foundation and engine room of innovation. Creativity builds skills such as deep perception, ideation, collaboration and communication. Creativity is to innovation what literacy is to reading and writing. In other words without creativity; dynamic, lateral and effective innovation is unlikely to develop. Yet the STEM agenda expects teachers and schools to produce innovation learning strategies fully formed. In this presentation I will discuss the role of creativity as a driver of innovation across all subjects and fields and explore what we are missing out on by siloing STEM from other areas of creativity and innovation in the curriculum.

Dr Michael Anderson is Professor (Arts and Creativity) in the Faculty of Education and Social Work, University of Sydney where his research and teaching concentrates on the role creativity, the arts and play have on learning. This work has evolved into a program of research and publication that engages with arts classrooms directly. His recent publications explore how aesthetic education and research is changing learning in the 21st century.

Topic 3. HASS: Is deep learning ‘the elephant in the room for integration’ in the Humanities and the Social Sciences?

HASS subjects are dynamic, diverse and contested fields of learning characterised by the provisional and situated nature of their knowledge practices and understandings. It is no surprise then that approaches to integration in HASS in Australia have waxed and waned over the years as educators argue about discipline-based versus integrated approaches. Essentially, these debates centre on conflicting ideological assumptions about what knowledge is for and what sort of learning is required to deliver it. In this presentation I will revisit the debates about integration and consider how deep learning can occur in HASS.

Associate Professor Deborah Henderson teaches in pre-service teacher education programs in the Faculty of Education, Queensland University of Technology. She supervises higher degree research students, and researches and publishes in the fields of history curriculum, citizenship, social and environmental education, internationalisation and teacher education. She is currently Vice President of ACSA.
Response to keynote session topics

Robyn Ewing AM is Professor of Teacher Education and the Arts, at the Faculty of Education and Social Work, University of Sydney. As a former primary teacher she is passionate about the role quality arts experiences and processes can play in transformative pedagogy across all areas of education.

Robyn is a Council member and Chair of the Academic Board, Australian Film Television and Radio School; an Honorary Associate, Sydney Theatre Company; a Director, West Words; and visiting scholar of Barking Gecko Children’s Theatre. She is a former President of the Australian Literacy Educators’ Association, and Primary English Teaching Association Australia and Vice President of the Sydney Story Factory. Robyn was an ACSA Executive member from 1995–2001.

The response is followed by questions and reactions from the audience.

WORKSHOPS SESSION 1

Creating new solutions—using design thinking

A brief introduction to the process of design thinking and how it can be used with staff, students and community to create new solutions to existing challenges.

Donna Loughran is currently Principal of Doonside Technology High School. A passionate educator of 20 years, she has spent her career working in a schools in western and south-west Sydney. Donna works collaboratively with her school community to improve student learning through quality teacher professional learning and believes in empowering students to become active participants in their learning to thoroughly prepare them for the world beyond school.

How hard is 4C transformation and integrated learning?

Three principals from two primary Catholic schools and a secondary Catholic school in the diocese of Parramatta in western Sydney discuss the vision and realities of working towards school transformation. In schools of high student needs the principals discuss how the 4Cs: creativity, critical reflection, communication and collaboration, are transforming teachers and students. They explore how the 4C learning framework and pedagogy, innovative teaching and learning structures, and integrated curricula has deepened the practice of teaching, learning and leading in their schools. The principals discuss the real-world challenges of empowering their school communities and changing the educational landscape.

Mary Kastoun is early-career Principal of Sacred Heart, Westmead who worked with Yvette Baird, currently Principal of Holy Family, East Granville. They introduced 4C transformative learning and pedagogy two years ago into their schools, and have seen how it varies in school contexts with different student needs. Rob Muscat is the newly-appointed Principal to Delany College in Granville, and is collaborating with Mary and Yvette to sustain transformation and innovation in their schools.
Human rights in civics and citizenship education

The Australian Curriculum provides a rich opportunity for young people to learn about their human rights and the importance of respecting the rights and freedoms of others. This workshop explores how educators can help students to gain a critical understanding of human rights and responsibilities, and to develop the attitudes, behaviours and skills to apply human rights in everyday life. Participants will explore legislation and international declarations as well as other resources and exemplars related to individual human rights for people in learners’ own contexts, in the Australian nation and the wider world.

Associate Professor Libby Tudball teaches in pre-service teacher education programs in the Faculty of Education, Monash University. She supervises higher degree research students and researches and publishes in the fields of citizenship, social and environmental education, internationalisation and teacher education. She is President of the Social and Citizenship Education Association of Australia.

The hybridisation of constructivist instructional models to support the implementation of STEM

Parramatta Marist High is a comprehensive Catholic systemic all boys high school in western Sydney that initiated significant whole school change in 2008 and presently deploys three constructivist-based approaches to learning (project based, problem based, flipped classroom) across the school curriculum to meet the challenges of various NSW Board of Studies, Teaching and Education Standards (BOSTES) stages. However, in 2015 they embarked on a hybrid model to assist the implementation of the Stage 5 ‘STEM’ syllabus. This hybrid model promotes the development of essential skills in problem solving and collaboration, and affords opportunities for the acquisition of knowledge and understanding in an authentic practical context. The aim of this workshop will create discussion and understanding around this hybrid pedagogical approach and provide participants with opportunity to consider how these approaches might be applied to their own educational setting.

Gavin Hays is Assistant Principal at Parramatta Marist High School, Sydney. He has been at the forefront of the pedagogical change at Parramatta Marist, specifically in the areas of project-based learning (PBL), flipped learning and STEM. This has involved a number of international training opportunities within the United States, Singapore and Finland. He is an accredited PBL trainer within the New Tech Network and is recognised as a problem crafter by Republic Polytechnic in Singapore. Gavin is currently undertaking a doctoral study with Erasmus University, Rotterdam.

How can STEM make my life easier?

‘Technology’ is anything that can help solve a human problem or satisfy a need or want. It includes all types of human-made systems, materials and processes—not just modern computational and communication devices.

Research indicates that children develop a deeper understanding of scientific and mathematical concepts when they are linked. Solving problems by designing technologies provides the context for investigations and applications of these concepts.

Design, evaluate and share STEM activities that will address and reinforce outcomes across different curriculum areas. Explore how you can work smarter to engage your students and fulfil your curriculum requirements.

Shirley Casper taught science at primary and secondary levels, primary mathematics and science methods at university, and is now developing primary STEM activities at BOSTES to enable teachers to fully integrate the pillars of STEM in engaging and effective ways.
WORKSHOPS SESSION 1
SHOWCASE

1. STEAM—The synergy of six
In 2016, STEAM was launched at Xavier High School in Albury. Six faculties merged into an interdisciplinary course for all Year 9 students. STEAM emerged from the school’s desire to challenge our Year 9 students to equip them with real-world skill sets, prepare them for the academic rigour of senior schooling and to provide them with an opportunity to explore the world and its challenges through the lens of mathematics, science, technology, creative arts, engineering beyond our traditional curriculum constraints.

Nicole Morton is Assistant Principal, Leader of Learning at Xavier High School. Nicole is a passionate, dynamic and well informed leader who drives and inspires a commitment to change in pedagogical practices that impact school learning environments.

2. Teaching STEM: Flipped, electives or integration?
Independent Schools Queensland provides support for schools that are seeking to develop education pathways for high school students into STEM fields through mentored action research. These school research projects engage learners in innovative activities to raise the profile of science, mathematics and technology. This presentation will showcase action research projects in schools that trialled curriculum integration models for STEM teaching and learning. The outcomes of the research projects will be shared along with recommendations for schools.

Kathy Harris is an education services officer at Independent Schools Queensland and part of her role is to support STEM education in schools. She is an experienced primary school teacher and facilitator and has worked passionately with teachers and students in STEM education for 15 years.

WORKSHOPS SESSION 2

Riding the rollercoaster
Join the presenters as they share their experiences of leading change in a K–12 school. Accompany them as they navigate areas including integrated curriculum design and implementation; using technology to accelerate learning; development of STEAM, including coding; use of metacognitive language for maths problem solving and engaging with other educators through online professional learning networks. This presentation will explore the challenges of taking teachers out of their comfort zone and managing the highs and lows of being a novice. The experiences of students are interwoven into this presentation as staff experiment with and evaluate new curriculum, pedagogy and technology.

Dr Charlotte Forwood is the Leader of Advanced Learning, which encompasses student learning. A key component of her role is working collaboratively across year levels and subjects. She has authored more than 20 teacher and student resource books and is passionate about developing students’ oral language skills in particular.

Geoff Little is the acting Head of the Junior School Strathcona. He holds a Masters in Education and has authored teacher reference books for Oxford University Press. Recognised as an innovative educator, he draws on the latest research and pedagogy when working with teachers to develop learning opportunities that are engaging and innovative for students.
Lessons learnt the hard way

The Australian Science & Mathematics School has been working in the area of interdisciplinary curriculum since 2003, and has explored the opportunities and challenges that this brings in a senior secondary setting. We have used a number of models as our philosophies, pedagogies and practices have evolved. In this workshop we will look at some of the significant steps we have taken, culminating in our newest interdisciplinary unit that aims to meaningfully integrate science, mathematics and English in an inquiry-based curriculum.

Andy Stone has been at the Australian Science & Mathematics School (ASMA) since it started in 2003, and is currently the Senior Leader, Interdisciplinary Curriculum.

Dr Matthew Verdon is currently the Data Analysis Leader at the ASMS and has been teaching there for three years. He has become heavily involved with codesign of curriculum and the efforts to increase interdisciplinarity and sees great potential in exploring this space.

The place of HASS in the curriculum

This workshop explores the important place HASS has in the curriculum and the need for schools to seriously consider the extent and quality of the humanities curriculum they are presently offering. When talking about critical and creative thinking, ‘real world’ application and future ‘usefulness’ of a learning area, the HASS learning area is often undervalued as an important component of the curriculum in a school. The concepts for the four subjects of HASS (history, geography, civics and citizenship, and economics and business) provide a conceptual framework for students to make sense of the world they live in. Most importantly, the conceptual thinking of the HASS subjects provide a context for the contemporary world and a framework for students to critically and creatively assess possible, probable and preferred futures for themselves and the world in which they live. The concepts across the HASS learning area provide the opportunity for teachers to consider connections through the concepts across the HASS subjects to enhance thinking and in turn contribute to the all-around intellectual and societal development of students.

Malcolm Mcinerney considers quality humanities education is critical for a relevant and balanced school curriculum and has been heavily involved in the development, teaching and promotion of the humanities learning area for many years. Malcolm’s experience includes being a humanities coordinator in South Australian secondary schools since 1982, immediate past Chair of the Australian Geography Teachers Association; member of ACARA’s Australian Curriculum: Geography Advisory Panel; Executive Director of the Education Services Australia GeoSpace Supporting Australian Curriculum Online project; President of the Australian Alliance of Associations in Education and HASS Curriculum Manager for South Australia’s Department for Education and Child Development.
Australian Curriculum: Technologies and STEM Connections

The Australian Curriculum: Technologies focuses on the key ideas of creating preferred futures, project management, and design, computational and systems thinking. The Australian Curriculum, Assessment and Reporting Authority (ACARA) in partnership with the Association of Australian Mathematics Teachers coordinated the STEM Connections action research project. The project investigated different school-based approaches to integrating STEM learning areas. The lessons learned from this project have contributed to our understanding of how best to foster integrated STEM learning.

This workshop will focus on:

• an overview of the technologies curriculum and the STEM Connections project
• strategies to identify meaningful connections to enhance STEM knowledge, understanding and skills, and transfer.

Julie King is Curriculum Lead Technologies, ACARA and is responsible for the Australian Curriculum: Technologies. She is also a Director of Primary Industries Education Foundation Australia. Julie has previously worked as a teacher, distance education writer, curriculum advisor and manager for the NSW Department of Education.

Family routes—connecting through story

In 2015, Casula Public School had the privilege of working with the Sydney Opera House in a joint venture called ‘Creative Leadership in Learning’. Over 10 weeks a group of culturally diverse students worked with a teaching artist to research and tell their family story in creative ways that promoted collaboration, communication and critical thinking. Visits to the Opera House strengthened student understanding of effective storytelling techniques through creative processes. An opportunity existed at the end of the project for all students to present their personal story at the Opera House in front of family members. Staff involved in the project were professionally up-skilled prior to the project by Sydney University academics Michael Anderson and Miranda Jefferson on the ‘creativity cascade’ which formed the framework for the project.

Shelley Diamond is the Relieving Principal of Casula Public School. Rob Edwards is a Kindergarten teacher and leader of creative and critical thinking at Casula Public School.
WORKSHOPS SESSION 2
SHOWCASE

STEAM into STEM: Linking to the Australian Curriculum

This session will introduce our school’s approach to providing students with integrated STEAM and STEM learning experiences that are aligned to the Australian Curriculum. Working in collaboration with the local university, the STEAM in to STEM program centres on the use of an engineering-like process to develop students’ problem solving ability grounded in realistic scenarios. Through this, we have seen the students develop various other 21st century skills. The presentation will also delve into the human, financial and physical resourcing obstacles that we have faced when implementing the program, and how these were overcome. Importantly, the discussion examines some familiar yet difficult to resolve pedagogical issues in STEM education, namely: (a) what do we mean by teaching STEM (b) what do we mean by the term integrated STEM and (c) how and why we would choose to teach STEM in an integrated manner.

Grant Smith is a head of department of STEM and STEAM in the Queensland Education Department and is based at Everton Park Senior High School. He has a passion for STEM and has worked extensively and intensively in primary and secondary schools to promote STEM-related subjects to build skills in students for jobs of the future.

Dr David Nutchey is a lecturer in STEM education at Queensland University of Technology’s Faculty of Education. His interests lie in creating learning experiences that involve students undertaking authentic experiences of STEM and how these experiences can be aligned to curriculum goals.

MASTERCLASSES SESSION 1

A learning design platform created by teachers, for teachers

Design/Engage is a learning design platform developed over two years by teachers at Northern Beaches Christian School then tested and refined with over 20 schools around Australia and New Zealand. In this session we will use a physical design kit (consisting of scaffolded magnetic whiteboards and archetype cards) to apply a design thinking process to the crafting of learning experiences for students. After the session participants can use a digital version of the kit and access an online portal with further training and resources.

Steve Collis is Director of Innovation at the Sydney Centre for Innovation in Learning, an innovation unit embedded in a K–12 school. He is an ‘ideas guy’ with a passion for finding innovations that genuinely work across contexts, and believes empathy, insight and vision are the foundations of great learning design.
Transforming schools: Creativity, critical reflection, communication and collaboration

Changes in society have resulted in an increased need within schools to focus on developing transferable skills: collaboration, critical thinking, communication and creativity (the 4Cs). The 4Cs have long been embedded within arts education, but Transforming Schools: Creativity, critical reflection, communication and collaboration draws on pedagogical innovations to explore ways in which all schools can focus on the 4Cs to transform teaching and learning. Miranda Jefferson and Michael Anderson demonstrate how a renewed approach to teaching that integrates the 4Cs can better equip today’s learners. They draw on their own international research looking at ongoing school reform process in a variety of school settings, working in partnership with practitioners, researchers, students and the community. The authors consider how schools might restructure to bring the 4Cs to the fore. Essential reading for those looking to transform schools and more effectively meet the needs of today’s learners.

Dr Michael Anderson is Professor (Arts and Creativity) in the Faculty of Education and Social Work, University of Sydney. His research and teaching concentrates on the role of creativity, the arts and play have on learning. This work has evolved into a program of research and publication that engages with arts classrooms directly. His recent publications explore how aesthetic education and research is changing learning in the 21st century.

Dr Miranda Jefferson is co-founder and innovative practice leader of 4C Transformative Learning and has been involved in leading innovation in schools for over 20 years. She leads programs, initiatives and research in curriculum reform, educational change and school transformation in several schools. Miranda is also a teaching educator with the Catholic Education Office Parramatta Diocese.

Integrating education for sustainability into civics and citizenship education

This masterclass engages participants in explorations of teaching and learning strategies to develop democratic and participatory citizenship that leads to youth action for sustainability in Australia. First the concepts of education for sustainability (EFS) and social action competence are discussed, then participants will be provided with examples of various programs in EFS that develop civics and citizenship knowledge and skills and lead to tangible outcomes for sustainability. These include student actions teams, AUSSI schools and Resource Smart programs and strategies for schools developed by the Australian Youth Climate Coalition.

Note: Participants are asked to bring their mobile device for this masterclass.

Associate Professor Libby Tudball teaches in pre-service teacher education programs in the Faculty of Education, Monash University. She supervises higher degree research students and researches and publishes in the fields of citizenship, social and environmental education, internationalisation and teacher education. She is President of the Social and Citizenship Education Association of Australia.

Associate Professor Deborah Henderson teaches in pre-service teacher education programs in the Faculty of Education, Queensland University of Technology. She supervises higher degree research students and researches and publishes in the fields of history curriculum, citizenship, social and environmental education, internationalisation and teacher education. Deborah is currently Vice President of ACSA.
**Year 7–8 STEM_ed: It really is rocket science**

STEM_ed takes a project-driven approach to the NSW Stage 4 syllabuses in science, mathematics and (mandatory) technology. It incorporates a full teaching and learning program across all three key learning areas. This workshop will describe the benefits and challenges that have been experienced since STEM_ed was first introduced as a pilot program in 2014–15, followed by its implementation for all Year 7–8 classes in 2016. Participants will receive a sample Scope and Sequence, and sample project briefs to help develop similar programs for their own schools.

Mike Nightingale is the Deputy Principal of Mount Annan Christian College, located on the south-western outskirts of Sydney. He has been teaching secondary school mathematics since 1989. In 2014, he and two other teachers decided that something really did need to be done to make school less boring. STEM_ed is the result of their efforts.

**Moving beyond a diary entry of a fallen soldier: Integrating history and civics in F–6 HASS**

The F–6 HASS curriculum offers primary teachers unique opportunities to explore Australian history within the broader agenda of literacy and numeracy. However, the curriculum still demands teachers promote a deep understanding of the concepts of the history, geography and civics and citizenship. Integration under HASS does not mean a return to a social studies approach; rather, teachers need to seek ways to use the general capabilities to develop meaningful ways of integrate key concepts and develop a disciplinary understanding of the learning area. This presentation examines ways to develop a rich understanding of history and civics through inquiry-based learning.

Dr Mallihai Tambyah is a lecturer in Social Education in the Faculty of Education, Queensland University of Technology and works with primary and secondary pre-service history teachers. Her research interests include social science teachers’ knowledge, teacher professional identity, history teacher education and policy.

**STEM Integration Stage 4**

The Secondary Education STEM Team will present resources and strategies used in their Stage 4 Integrated STEM project. The workshop will share the processes used to develop the integrated units of work and will describe the process used to establish integrated learning in STEM, showcase units of work developed and include the programming tools used to develop Integrated STEM units of work, engage participants in project-based learning through an activity that demonstrates the principles and their application in integrated STEM learning. The target audience for this workshop is 7–12 science, mathematics and technological and applied studies teachers and executive teachers.

The NSW Department of Education STEM team includes Vatche Ansourian, Ruth Glasgow, Dan Rytmeister, Sally Bannerman and Nagla Jebeile. Advisors are experts in mathematics, science, technologies and numeracy, and collectively they support NSW public schools with STEM professional learning, student learning pedagogy and projects which bring teachers together to design and develop innovative programs for STEM education.
**Shifted thinking: New school–museum learning**

Contemporary school–museum learning experiences are being challenged and transformed with approaches such as codesign, project-based learning, and gamification. Museum educators build on constructivist platforms to create learner-centred engagements which encourage the shift from expert to collective expertise, from didactic to discursive, from visitors looking and listening to doing and speaking. Many school educators still prefer the ‘old-school’ style docent led, information rich tours. To achieve impact at scale, design experiments leverage digital platforms for possibilities for improved and increased utilisation of museum objects within the classroom.

This presentation scans the contemporary museum–school landscape to highlight successful practice and points of resistance.

Peter Mahony is Manager of Education and Digital Learning for Sydney’s Museum of Applied Arts and Sciences. He is responsible for program direction of the Museum’s booked group learning experiences across three sites. Peter’s driving question is how best can the Museum offer learners in schools’ authentic and deep learning experiences.

**Teaching creatively**

The Sydney Opera House is a dynamic learning resource. The building abounds in opportunities for learning in science, maths, history and of course the humanities. Over the last two years the Sydney Opera House has been developing a creativity pedagogy to assist teachers get more out of this world class dynamic learning resource. The pedagogy is based on the work of Dr Miranda Jefferson and Professor Michael Anderson along with teachers, artists and other academics in a variety of disciplines. In this workshop participants will walk away with a definition of what creativity is, and how it can be taught. In addition participants will get fresh insights of how creativity can be used to teach across the curriculum providing fresh approaches to teaching maths, science, digital education and much more.

Frank Newman is currently the Creative Learning Specialist for the Sydney Opera House. Previously he was Artistic Director of Terrapin Puppet Theatre creating shows touring nationally and internationally and established the Ashfield Youth Theatre. He has over 20 years’ experience in community arts development working with young people and has won a Helpmann Award.

**Putting the A in STEAM**

What is the relevance of art across the curriculum? How has art been explored through subjects other than the visual arts? Consider the artist as educator and how this makes for the unique experience encouraging critical and creative thinking and fostering imagination, collaboration, communication and learning. Take a look at the work explored at the Art Gallery of NSW in this realm and the new approaches to learning that has been implemented in 2016 that is inspiring students and teachers to become lifelong learners.

Leeanne Carr is the Coordinator of Education programs at the Art Gallery of NSW. Her role is to foster learning through the Gallery’s collections and exhibitions for school age students and their teachers.
Want a STEM professional in your classroom, why wouldn’t you?

CSIRO STEM partnerships create and support ongoing, flexible partnerships between volunteer ICT professionals and teachers, showcasing real world, contemporary STEM fields in the classroom. The STEM professionals bring their infectious enthusiasm for their subject to the classroom which the students find difficult to resist.

Hear from, and about, CSIRO partnerships including the activities they do together and the impacts of the partnership on students, teachers and professionals. The presentation explores how partnerships support implementation of the Australian Curriculum: Digital Technologies and the ICT capabilities and how to fully utilise the knowledge, skills and capacity of a partner STEM professional.

Joel Cowey has worked in ICT for the departments of Defence, Environment, and Education, as a teacher of science and ICT and three years as a science and IT education policy officer in the Commonwealth Department of Education. Joel is currently the national coordinator for CSIRO ICT in Schools partnerships.

Drama, literature and literacy in the primary classroom

This practical workshop will share the methodology of Sydney Theatre Company’s ‘School Drama’ program. School Drama is a professional development program for primary school teachers, which demonstrates the increased learning when using drama pedagogy for teaching English and literacy to young learners. Developed over six years with leading academic Professor Robyn Ewing from the University of Sydney, teachers will leave the workshop with a range of process drama-based strategies to use when teaching literature in their classrooms.

John Nicholas Saunders is a former secondary school teacher and the current Education Manager at Sydney Theatre Company. John Nicholas has extensive experience in arts education, leading a performing arts department and is an Honorary Associate at the University of Sydney. He currently holds positions as President, Drama NSW; Board Director, Drama Australia; National Advocates for Arts Education; and Board Member, Playlab Press.

Exploring hands-on multidisciplinary STEM with Arduino Esplora

Multidisciplinary activities offer a great opportunity to study STEM related material from different points of view. Some topics can be addressed with activities that require steps such designing the experiment, and capturing and analysing data. The Arduino Esplora is a board that comes with a set of basic sensors (movement, temperature, light, buttons, joystick and slider) and outputs (buzzer, red/green/blue light) already wired. Together with a very simple and intuitive programming interface, the board offers an ideal platforms for students to explore physical phenomena, capture data, and understand the connection between sensors and outputs.

Dr Abelardo Pardo is Associate Head of Teaching and Learning and Senior Lecturer at the School of Electrical and Information Engineering, University of Sydney. He is the director of the Learning and Affect Technologies Engineering laboratory which specialises in educational technology, and co-director of the Learning Analytics Research Group. His areas of research are learning analytics, software for collaborative and personalised learning, and technology to improve the student experience and teaching practice. He is also manager of the Engineering and Technology Program at the STEM Teacher Enrichment Academy, University of Sydney.
Integrated curriculum to meet the needs of diverse learners

Philip Roberts is Assistant Professor in teacher education (curriculum studies) at the University of Canberra, ACT. His area of expertise is rural education, social justice and curriculum theory. Philip was awarded the 2015 Colin Marsh Award for his quality contribution to the curriculum debate in his article ‘Curriculum for the country: The absence of the rural in a national curriculum’ published in *Curriculum Perspectives*, 34(1).

Dorothy Hoddinott AO FACE and 2014 Australian Human Rights Medallist, has been Principal of Holroyd High School, a disadvantaged school in Sydney’s multicultural south-west since 1995. One in every two students has been in Australia less than three years and 60 per cent of all students are of recent refugee background. In 2016, 61 per cent of the 2015 HSC class received first round university offers.

Dorothy is an English and English as a Second Language teacher, and has also worked in policy advice, examinations and assessment, curriculum development, and teacher professional development at state and national levels.

She is a strong, fearless advocate for the human rights of young people, particularly those of young refugees and asylum seekers. She established the Friends of Zainab scholarship trust in 2002 to support the education of young asylum seekers. Dorothy was made an Officer of the Order of Australia in 2008, and was the Australian College of Educators’ Medallist in 2012, the first time a practising school educator had received that award, and only the third woman. She has been a Fellow of Senate of the University of Sydney since 2010 and Pro-Chancellor of the University since 2015.

Alan Reid is Professor Emeritus of Education at the University of South Australia. His research interests include educational policy, curriculum change, social justice and education, citizenship education and the history and politics of public education. He has published widely in these areas and gives many talks and papers to professional groups, nationally and internationally; and he has been involved in some significant policy developments in education at the state and national levels for many years.

Alan’s contributions to education have been recognised through a number of awards, at state and national levels such as the Gold Medal of the Australian Council of Educational Leaders which is presented annually to an Australian educator whose ‘contribution to the study and practice of educational leadership is assessed as most outstanding at the national level’. On Australia Day 2012 he was made a Member of the Order of Australia, for his contributions to education.
KEYNOTE 2

Curriculum integration: What could it look like? What would it take?

This keynote address takes a historical perspective on curriculum integration, exploring some of the key ideas on integration that emerged during the 20th century in Australia and elsewhere. It explores and interrogates a range of different models of curriculum integration in use over time and asks the critical question of what curriculum integration in the 21st century could and should look like, given the various enabling and constraining factors at play. It suggests a vision of curriculum integration that is simultaneously grounded in the ‘practical theory’ of key thinkers in the field historically, and also relevant and appropriate to current teaching and learning contexts. It aims to provoke and challenge symposium participants to think within and beyond current arrangements to imagine what might be possible.

Dr Nicole Mockler is a lecturer in the Faculty of Education and Social Work, University of Sydney. She began her career as a history/English teacher and held a number of school leadership roles before completing her PhD in 2008. She conducts research and publishes in the areas of curriculum and pedagogy, teacher professional learning and development and education policy.

WORKSHOPS SESSION 4

Making the change from project-oriented learning to project-based learning

What is project-oriented learning and are we guilty of doing it? How do we take STEM/STEAM beyond co-curricular projects and programs and authentically integrate it into our classes? How do we leverage the curriculum and leverage technology to create significant learning experiences for our students? This session will explore the concept of deeper and significant learning, highlight the High Tech High design principles, and demonstrate the habits of mind/learning dispositions that make project-based learning (PBL) more than just an educational fad.

Jake Plaskett is a product of High Tech High in San Diego, California where he was part of the first full graduating class and later returned to teach Mathematics and Music. Utilising his experiences and expertise in PBL and STEM, Jake is currently the Coordinator of Innovation and Learning at Rosebank College and has recently completed a consultancy in the NSW Department of Education, Futures Learning Unit where he delivered professional learning and developed innovative toolkits for teachers to help change their practice and deepen learning and engagement.

Game on—the role of game mechanics and online resources in cross-curriculum teaching and assessment

The Australian Curriculum has presented educators across the country with the best chance in years to re-examine cross-curriculum teaching and learning. But what is the best way to frame such diverse and rich learning experiences? Teacher librarian, ICT integrator and Human Society and Its Environment teacher Bill Cohen will look at the role that game mechanics and online resources can play in creating lesson sequences and assessments which combine subject areas in meaningful ways and encourage student engagement.

NB: This workshop will have a secondary focus, but everyone is welcome to attend.

Bill Cohen is the Teacher Librarian and ICT Integrator at Asquith Girls High School. Along with teaching Years 7–12 in both the public and private systems, Bill has also been the Education Content Manager for a national education website, and a regular columnist on technology and education for the ABC.
Using ‘real world’ contexts to bring interdisciplinary learning to life

This workshop aims to excite teachers about the possibilities the Australian Curriculum v8.1 brings while modelling what ‘real world’ teaching and learning looks and feels like. Drawing on innovative primary and secondary classroom tasks, this session will explore the potential to connect learning areas and general capabilities through ‘real world’ contexts. The focus will be financial capability, an example of teaching and learning spanning STEM and HASS.

Dr Carly Sawatzki is a teacher-educator with expertise in curriculum and pedagogy across upper primary mathematics, middle school economics and business, and senior school business studies. Working across these discipline areas is critical to her key area of research, education for financial capability. Carly is dedicated to involving school leaders and teachers in professional learning that promotes critical thinking and conversation, inspires innovation, and transforms pedagogical practice. She writes and presents for academic, teacher, and pre-service teacher audiences.

Promoting pre-service teachers’ STEM learning through collaboration between education, mathematics and science

The purpose of this session is to provide insight into a large scale, pre-service teacher education STEM initiative, the Opening Real Science project, by describing the interdisciplinary approach employed to create an online learning module, Modelling the present: Predicting the future. The module was created through collaboration among mathematicians, scientists and mathematics and science educators. Consistent with the practices employed within STEM-based disciplines, an enquiry-based approach was adopted as an underpinning principle of design. The model was evaluated through a trial with prospective secondary pre-service teachers and by documenting module team member’s perspectives on their interdisciplinary collaboration.

Joanne Mulligan is Professor of Education in the Department of Educational Studies at Macquarie University, specialising in mathematics and science education. Her career spans 30 years of contribution to teacher education and professional learning, as well as STEM education research. She currently leads Opening Real Science, a large Australian Government funded project.

How does your garden grow? Cultivating the curriculum with STEM

How can we grow successful learners, confident and creative individuals and active and informed citizens? How can we create learning that is meaningful and engaging for our students? Learn how Alstonville Public School has cultivated their students’ learning through curriculum integration with a focus on STEM. Kirstin will illustrate the school’s practices using teacher programs, student work and student voice. Kirstin will scaffold the steps taken to create authentic learning experiences for students in a practical way you can take back to school and implement yourself.

Kirstin Beck is Relieving Deputy Principal at Alstonville Public School leading curriculum innovation and change in a large regional primary school. Kirstin’s passion is to inspire and support teachers in developing future focused learning experiences that ignite students’ interest and engagement. Kirstin’s focus areas are curriculum integration, project-based learning pedagogy, embedding technology in learning, STEM and Maker Space development.
Making the seemingly impossible possible with HPC and PBL in K–12 contexts

The masterclass is focused on examining a pedagogical framework for design-based learning known as High Possibility Classrooms (HPC). The framework is drawn from exemplary teachers knowledge of technology integration; its conceptions of theory, creativity, public learning, life preparation and contextual accommodations fit with STEM, STEAM and HASS learning in K–12 schools. Two powerful examples of the possible will be shared with participants; one, project-based learning (PBL) in a NSW secondary school as an argument for opening up STEAM education; and two, Minecraft as a platform for creative and engaged learning across the curriculum in a NSW primary school classroom.

Potential hazard for participants: You may not feel the same about learning in schools after this masterclass.

Dr Jane Hunter works in the School of Education at the University of Technology Sydney where she is conducting postdoctoral research using the High Possibility Classrooms framework to build teacher capacity in STEM in primary schools.

Bianca Hewes is the Head Teacher, Teaching and Learning at the Manly Selective Campus of the Northern Beaches Secondary College. She has been a high school English teacher since 2005. Bianca started to experiment with PBL in 2010 and is regarded as a leading practitioner in the field.

Lee Hewes teaches Year 4 at Merrylands East Public School in south-west Sydney; he is a ‘dude who likes hanging with kids, helping them learn and be cool—there are loads of awesome curriculum-based activities on our Minecraft server’. Can’t argue with that!

Follow these education peeps on Twitter: @janehunter01, @BiancaH80, @waginski

Curriculum integration: When I get a minute!

This workshop session integrates theoretical notions of curriculum integration with a practical ‘rich task’ approach. In the ‘taster’ session, a worked example of an integrated unit, built with a focus on engagement and the delicate balance between formative and summative assessment, will be deconstructed with participants.

For the masterclass, participants are encouraged to bring a focus area/concept/idea/provocation for a unit of work. Over the course of the masterclass, participants will be guided to develop their chosen focus into an integrated unit of work for students (K–12).

Dr Debra Talbot is a lecturer in Education and Co-director of Professional Experience, University of Sydney. She has more than 20 years’ experience as a classroom teacher, head of department in government and independent sectors, and professional learning consultant. Debra’s research interests are in teacher professional learning, curriculum, pedagogy, and social justice. She continues to work with teachers in schools in these areas.

Dr Nicole Mockler is a lecturer in the Faculty of Education and Social Work, University of Sydney. She began her career as a history/English teacher and held a number of school leadership roles before completing her PhD in 2008. She conducts research and publishes in the areas of curriculum and pedagogy, teacher professional learning and development and education policy.
Creating significant learning experiences through PBL

What is significant learning and how do we create significant learning experiences for our students? How do we cultivate an ethic of excellence and create beautiful work? Future-focused teaching and learning demands teachers to employ new practices in order to keep the learning authentic, purposeful and student centred. This interactive presentation will explore some of the deeper learning pedagogies, how to re-imagine teaching and learning in your context, and how to integrate skills and content from multiple subject areas in an authentic, interdisciplinary projects.

Jake Plaskett is a product of High Tech High in San Diego, California where he was part of the first full graduating class and later returned to teach mathematics and music. Utilising his experiences and expertise in interdisciplinary projects and STEM, Jake is currently the Coordinator of Innovation and Learning at Rosebank College and has recently completed a consultancy in the NSW Department of Education’s Futures Learning Unit where he delivered professional learning and developed innovative toolkits for teachers to help change their practice and deepen learning and engagement.

Intercultural competence for 21st century learners: Integrating curriculum in primary school

This session uses evidence of willing participants’ intercultural competence (by asking them to complete a confidential survey) to help develop skills to increase this competence. Using cooperative learning, collaborative ICT apps and ‘big picture’ materials developed for the NSW Professional Teachers’ Council this session provides some direction for teachers wanting to integrate global perspectives in every discipline and still teach the Australian Curriculum. All activities and resources have been trialled with teachers and pre-service teachers.

The Global Education Research and Teaching team at the University of Newcastle has been working with pre-service teachers to integrate global perspectives in all areas of the primary school curriculum over the past seven years. Their most recent publication is a collection of units of work, Growing up Globally. Teaching global education in primary classrooms. Contact: Associate Professor Ruth Reynolds, University of Newcastle

Curricula integration revisited in K–6

Curricula integration provides clarity for the use of more than one curriculum area. It places students at the centre of learning and connects them to the real world by linking key learning areas with different perspectives. It helps students think creatively to form innovative ideas around the concepts being studied. In this masterclass we will explore Hudson’s (2013) model for curricula integration as a way of providing a more holistic approach to make the primary curriculum more relevant and meaningful for students.

Vilma Galstaun is a lecturer in education, University of Sydney. Her key teaching areas are embedding ICT in teaching and learning, and curriculum planning for the primary classroom. She teaches across the undergraduate and graduate degrees of Bachelor of Education and Masters in Teaching for both primary and secondary education.
FINAL KEYNOTE

A question of impact? Curriculum, aspirations, and collaboration

In this presentation, Jenny will bring together findings from two recent projects: a longitudinal study of the aspirations of students in Years 3 to 12 and a study of the impact of Quality Teaching Rounds, an approach to teacher development, on the quality of teaching. She will consider the impact of current curriculum structures and teaching approaches on students’ high interest in careers involving the arts, sports, and the sciences and low interest in careers involving mathematics and will speculate on whether STEM, STEAM and HASS might produce different outcomes. She will also explore insights arising from teachers working in cross-curriculum groups.

Jenny Gore is Professor in the School of Education at the University of Newcastle where she is Director of the Teachers and Teaching Research Centre and Chief Editor of the international journal, Teaching and Teacher Education. Her educational and research interests consistently centre on quality and equity.
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