



ECH 431

Teaching and Learning Mathematics

S1 External 2018

Department of Educational Studies

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General Information

Unit convenor and teaching staff

Unit convenor

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Tutor

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Credit points

3

Prerequisites

ECH335 or ECHE234

Corequisites

Co-badged status

Unit description

This unit builds on the knowledge gained in previous units, further developing student's knowledge of the principles and practices of teaching and learning mathematics. Students explore a range of strategies for assessing children's mathematical understandings, and design and implement lesson sequences to enhance the growth of children's mathematical thinking. The integration of technology with mathematics and with other Key Learning Areas, including differentiating curriculum to meet the diverse needs of learners, is also addressed.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

Develop further understanding of the major theoretical and research directions and

current issues in mathematics education.

Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.

Demonstrates knowledge of mathematical concepts and processes in the areas of number and algebra, statistics and probability, measurement and geometry and working mathematically.

Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.

Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.

Demonstrates a capacity to use software for student profiling and reporting, lesson preparation and general administrative tasks.

Develop and awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Weekly reflective postings</u>	40%	No	Weekly
<u>Essay and presentation</u>	35%	No	Week 6, Week 7, OCD
<u>Research review and guides</u>	25%	No	Week 13

Weekly reflective postings

Due: **Weekly**

Weighting: **40%**

Students are required to submit a posting (minimum of 300) words weekly. Students are required to read other students entries and comment on at least one (minimum of 100 words)

On successful completion you will be able to:

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- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.
- Develop and awareness of the range of application and adaptive technologies available to support students with special needs.

Essay and presentation

Due: **Week 6, Week 7, OCD**

Weighting: **35%**

Individual essay focusing on mathematics and meeting the needs of diverse learners. Group presentation of findings to class.

On successful completion you will be able to:

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Research review and guides

Due: **Week 13**

Weighting: **25%**

Students identify key issues from research and develop information guides for families.

On successful completion you will be able to:

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current issues in mathematics education.

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Delivery and Resources

Weekly lecture (live and recorded), weekly 2 hour tutorial (internal students), on campus days (distance student), online discussions.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
- Demonstrates knowledge of mathematical concepts and processes in the areas of number and algebra, statistics and probability, measurement and geometry and working mathematically.
- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.
- Demonstrates a capacity to use software for student profiling and reporting, lesson preparation and general administrative tasks.
- Develop and awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment tasks

- Weekly reflective postings
- Essay and presentation
- Research review and guides

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.
- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
- Demonstrates knowledge of mathematical concepts and processes in the areas of number and algebra, statistics and probability, measurement and geometry and working mathematically.
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Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.
- Demonstrates a capacity to use software for student profiling and reporting, lesson preparation and general administrative tasks.

Assessment tasks

- Weekly reflective postings

- Essay and presentation
- Research review and guides

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.
- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
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Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to

critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.
- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
- Demonstrates knowledge of mathematical concepts and processes in the areas of number and algebra, statistics and probability, measurement and geometry and working mathematically.
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Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.
- Demonstrates knowledge of mathematical concepts and processes in the areas of number and algebra, statistics and probability, measurement and geometry and working

mathematically.

- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
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Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.
- Demonstrates a capacity to use software for student profiling and reporting, lesson preparation and general administrative tasks.
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Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
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- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.

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Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other areas of curriculum.
- Demonstrates research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrates effective mathematics teaching and learning strategies for meeting the needs of Indigenous students.

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- Essay and presentation
- Research review and guides

Changes since First Published

Date	Description
12/02/2018	Hello- I noticed a typo when I was reviewing this from the units site. It was in one of the assessment tasks ('giude' instead of 'guide') That was the only change. Kind regards Kelly