ECED827

Learning Through Mathematics, Science and Technology in Early Childhood Settings

S2 External 2019

Department of Educational Studies

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Disclaimer

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General Information

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Tutor
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Credit points
4

Prerequisites
[Admission to (MTeach(Birth to Five) or GradCertEChild) and (ECED600 or ECED817)] or [admission to MEChild or MEd or MEdLead or MIndigenousEd or MSpecEd or GradCertEdS]

Corequisites

Co-badged status

Unit description
This unit explores theories of learning in mathematics, science and technology for young children (birth to five years). Students will examine the specialist role of play and conceptual development in a range of early childhood settings. Current issues in research and practice will be investigated through independent study. Students acquire autonomy and expert knowledge of pedagogy and content for mathematics, science and technology as they design and evaluate learning experiences for young children.

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:

> Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.

Examine the role of play in children's mathematics, science and technology in early learning settings.

Evaluate a number of mathematics, science and technology resources

Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.

Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

General Assessment Information

Assignment extensions and late penalties

Applications for extensions must be made via AskMQ at https://ask.mq.edu.au as a Special Consideration request before the submission date. Students who experience a disruption to their studies through ill-health or misadventure are able to apply for this request. Extensions can only be granted if they meet the Special Considerations policy and are submitted via https://ask.mq.edu.au/. This will ensure consistency in the consideration of such requests is maintained.

In general, there should be no need for extensions except through illness or misadventure that would be categorised as unavoidable disruption according to the University definition of same, see: https://students.mq.edu.au/study/my-study-program/special-consideration

Late submissions without extension will receive a penalty of 5% reduction of the total possible mark for each day late (including weekends and public holidays). You are reminded that submitting even just 1 day late could be the difference between passing and failing a unit. Late penalties are applied by unit convenors or their delegates after tasks are assessed.

No assessable work will be accepted after the return/release of marked work on the same topic. If a student is still permitted to submit on the basis of unavoidable disruption, an alternative topic may be set.

Students should keep an electronic file of all assessments. Claims regarding "lost" assessments cannot be made if the file cannot be produced. It is also advisable to keep an electronic file of all drafts and the final submission on a USB untouched/unopened after submission. This can be used to demonstrate easily that the assessment has not been amended after the submission date.

Requesting a remark of an assignment

If you have evidence that your task has been incorrectly assessed against the grade descriptors you can request a re-mark. To request a re-mark you need to contact the unit convenor within 7 days of the date of return of the assignment and provide a detailed assessment of your script against the task criteria. Evidence from your assignment must be provided to support your judgements.

Note: Failed assessments can not be re-submitted as they are all double-marked as a part of the

moderation process.

Please note: The outcome of a re-mark may be a higher/lower or unchanged grade. Grades are standards referenced and effort is NOT a criterion.

Assessment Presentation & Submission Guidelines

Please follow these guidelines when you submit each assignment:

- Allow a left and right-hand margin of at least 2cm in all assignments.
- Please type all assignments using 12-point font and 1.5 spacing.
- All assessments must be submitted through Turnitin in .doc or .pdf format
- It is the onus of the student to ensure that all assessments are successfully submitted through Turnitin.
- Faculty assignment cover sheets are NOT required.

Draft Submissions & Turnitin Originality Reports

- Students may use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.
- Students are strongly encouraged to upload a draft copy of each assessment to Turnitin at least one week prior to the due date to obtain an Originality Report.
- The Originality Report provides students with a similarity index that may indicate if plagiarism has occurred. Students will be able to make amendments to their drafts prior to their final submission on the due date.
- Generally, one Originality Report is generated every 24 hours up to the due date.

Please note:

- Students should regularly save a copy of all assignments before submission,
- Unless there are exceptional circumstances, no assessment will be accepted after the date that the assessment has been returned to other students.
- Students are responsible for checking that their submission has been successful and has been submitted by the due date and time.

University policy on grading

Criteria for awarding grades for assessment tasks

Assignments will be awarded grades ranging from HD to F according to guidelines set out in the University's Grading Policy. The following descriptive criteria are included for your information.

Note: If you fail a unit with a professional experience component the fail grade will be on your transcript irrespective of the timing of when the placement takes place.

Criteria for awarding grades in the unit

Students will be awarded grades ranging from HD to F according to guidelines set out in the policy: https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/assessment-in-effect-from-session-2-2016

The following generic grade descriptors provide university-wide standards for awarding final grades.

Grade	Descriptor
HD (High Distinction)	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the discipline.
D (Distinction)	Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.
Cr (Credit)	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the discipline.
P (Pass).	Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes
F (Fail)	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

Withdrawing from this PG Unit

If you are considering withdrawing from this unit, please seek academic advice by writing to https://ask.mq.edu.au before doing so as this unit may be a co-requisite or prerequisite for units in the following semesters and may impact on your progression through the degree.

Other important policies

Macquarie University policies and procedures are accessible from Policy Central. Students

should be aware of the policies listed in this/the Unit Guide with regard to Learning and Teaching.

For this Unit, students must also be aware of the following specific requirements:

- Students must meet the mandatory requirements to undertake placements as specified in this/ the Unit Guide. These may include both University requirements and mandatory requirements specified by the accrediting authority such as the Working with Children check.

- Macquarie University operates under a 'Fit to Sit' model as specified in the University's Special Consideration Policy. For this Unit, this means that, when undertaking a placement, a student is declaring that they are fit to do so. It is the responsibility of the student to determine whether they are fit to undertake a placement. Therefore, if a student is feeling unfit to undertake a placement, they should not do so.

- If a Student is identified by the Unit Convenor as being 'At Risk', the Department's 'At Risk' procedure will be activated and they will not be able to withdraw themselves from this Unit.

- The timing of placements can vary. For placements early in the Session, Fail grades may be approved by the University prior to the end of Session for students who do not meet the placement expectations of the Unit.

Other policies that relate to Learning and Teaching (see Policy central):

Academic Honesty Policy

Assessment Policy

Grade Appeal Policy

Complaint Management Procedure for Students and Members of the Public

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/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 enquiry service

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

Equity 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.

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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Mathematics and science	50%	No	06/09/2019
Technology	50%	No	08/11/2019

Mathematics and science

Due: **06/09/2019**
Weighting: **50%**

Students are required to develop a sequence of learning events relating to mathematical and scientific thinking in the early years. 2500-3000 words.

On successful completion you will be able to:

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.

- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Technology

Due: **08/11/2019**
Weighting: **50%**

Students are required to develop a literature review of contemporary research, and then develop a review of technological resources that can support mathematical and scientific thinking and learning in young children.

On successful completion you will be able to:

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
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Delivery and Resources

Unit Expectations

- Students are expected to read weekly readings before completing tasks and attending tutorials
- Students are expected to listen/attend weekly lectures before completing tasks and attending tutorials

Note: It is not the responsibility of unit staff to contact students who have failed to submit assignments. If you have any missing items of assessment, it is your responsibility to make contact with the unit convenor.

Electronic Communication

It is the student's responsibility to check all electronic communication on a regular weekly basis. Communication may occur via:

- Official MQ Student Email Address
- The Dialogue function on iLearn
- Other iLearn communication functions

Prescribed Texts:

The following is available from the University Cooperative Bookshop and it is **essential** for this unit.

MacDonald, A. (2015). *Investigating mathematics, science and technology in early childhood.* South Melbourne: Oxford University Press.

Unit Schedule

Week/ Date	Topic
Week 1 29 July	Introduction to the unit. Early mathematical thinking and learning Math concepts and processes: Number and pattern. *Kelly Johnston*
Week 2 5 August	Math concepts and processes: Shape and measurement *Kelly Johnston*
Week 3 12 August	Math concepts and processes: Chance and data Storytelling and mathematics *Kelly Johnston*
Week 4 19 August	Science – Earth sciences and environmental education *Camilla Gordon*
Week 5 26 August	Space science and living things *Camilla Gordon*
Week 6 2 September	Chemistry and Physics *Camilla Gordon*
Week 7 10 September	Historical concerns. Young children learning with technology *Kelly Johnston*
Mid-Semester Break On campus day – 21 September	
Week 8 30 Sept. *Public holiday- no tutorial*	Technology and digital citizenship *Kelly Johnston*

Week 9 7 October	Technological play- Screens and Beyond *Kelly Johnston*
Weeks 10-12	ECED603 professional experience placements – no tutorials or reading tasks.
Week 13	Early STEM *Kelly Johnston*

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). 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). 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).

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Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early

learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Examine the role of play in children's mathematics, science and technology in early learning settings.
- Evaluate a number of mathematics, science and technology resources
- Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology.
- Locate and synthesise a wide range of contemporary research literature relating to mathematics, science and technology in early learning.

Assessment tasks

- Mathematics and science
- Technology