ECED827
Learning Through Mathematics, Science and Technology in Early Childhood Settings

S2 External 2013

Institute of Early Childhood

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General Information

Unit convenor and teaching staff
Unit Convenor
Kate Highfield
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Contact via kate.highfield@mq.edu.au

Other Staff
Marina Papic
marina.papic@mq.edu.au
Contact via marina.papic@mq.edu.au

Credit points
4

Prerequisites
ECED600 or ECED817 or admission to MEChild or MEd or MEdLead or PGDip EChild or PGCertEChild or PGDipEdS or PGCertEdS

Corequisites

Co-badge 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://students.mq.edu.au/important-dates

Learning Outcomes

1. Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education
2. Examine the role of play in children’s mathematics, science and technology learning
3. Demonstrate how children use play to represent their experiences, construct knowledge
about, and make sense of their world
4. Evaluate a variety of mathematics, science and technology resources
5. Engage in the multi-faceted task of early childhood curriculum design with an emphasis on mathematics, science and technology
6. Locate, analyse and synthesise a wide range of current research literature
7. Identify problems or issues of relevance to early childhood mathematics, science, and technology education
8. Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community

### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 2</td>
<td>35%</td>
<td>31st October</td>
</tr>
<tr>
<td>Weekly online posts</td>
<td>30%</td>
<td>weekly</td>
</tr>
<tr>
<td>Assessment 1</td>
<td>35%</td>
<td>3rd October</td>
</tr>
</tbody>
</table>

### Assessment 2

**Due: 31st October**

**Weighting: 35%**

Students will select from OPTION A (developing a mathematics GLOG) or OPTION B (Individual Inquiry Project Report). Further details for these tasks can be obtained in the unit outline on iLearn

This Assessment Task relates to the following 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 learning
- Demonstrate how children use play to represent their experiences, construct knowledge about, and make sense of their world
- Evaluate a variety 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, analyse and synthesise a wide range of current research literature
- Identify problems or issues of relevance to early childhood mathematics, science, and technology education
• Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community

Weekly online posts
Due: weekly
Weighting: 30%

Each week students will respond to a weekly online task, such as a reflection on the readings a response to a provocation or evaluation of a resource.

This Assessment Task relates to the following Learning Outcomes:
• Demonstrate a fundamental understanding of the major theoretical developments in early childhood mathematics, science and technology education
• Evaluate a variety of mathematics, science and technology resources
• Locate, analyse and synthesise a wide range of current research literature
• Identify problems or issues of relevance to early childhood mathematics, science, and technology education
• Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community

Assessment 1
Due: 3rd October
Weighting: 35%

Students will select from OPTION A (developing a science article) or OPTION B (Individual Inquiry Project Proposal). Further details for these tasks can be obtained in the unit outline on iLearn

This Assessment Task relates to the following 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 learning
• Demonstrate how children use play to represent their experiences, construct knowledge about, and make sense of their world
• Evaluate a variety 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, analyse and synthesise a wide range of current research literature
• Identify problems or issues of relevance to early childhood mathematics, science, and
technology education

- Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community

**Delivery and Resources**

**Delivery**

This unit is delivered both online (for internals and externals) through weekly workshops (for internals) or an optional on campus day (externals). Additional content such as resource links are provided via iLearn.

**Resources**

Students from the MTeach are encouraged to purchase the text:


Additional readings and research literature are provided via e-research and online journals.

**Technology**

Students are required to access a range of technologies. Essential tools include access to online resources and basic word processing software. Additional resources (eg iPad and tablet technologies) would also be considered advantageous.

**Changes since last offering**

ECED827 has had a change of unit convenor, redesign of assessment tasks and alteration of content delivery since its last offering.

**Unit Schedule**

The following overview will provide some insight into the unit schedule. A complete unit schedule is available in the unit outline on iLearn.

<table>
<thead>
<tr>
<th>Wk</th>
<th>Week beginning</th>
<th>Content</th>
<th>Presenter</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29/7/13</td>
<td>Play &amp; learning Maths, Science &amp; Technology</td>
<td>Kate Highfield</td>
<td>Weekly posting due by 12 midday Friday 2\textsuperscript{nd} August</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Unit</td>
<td>Instructor</td>
<td>Assignment Details</td>
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<td>--------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>5/8/13</td>
<td>Technology 1</td>
<td>Kelly Bittner</td>
<td>Weekly posting due by 12 midday Friday 9\textsuperscript{th} August</td>
</tr>
<tr>
<td>3</td>
<td>12/8/13</td>
<td>Technology 2</td>
<td>Kelly Bittner</td>
<td>Weekly posting due by 12 midday Friday 16\textsuperscript{th} August</td>
</tr>
<tr>
<td>4</td>
<td>19/8/13</td>
<td>Technology 3</td>
<td>Kelly Bittner</td>
<td>Weekly posting due 12 midday Friday 23\textsuperscript{rd} August</td>
</tr>
<tr>
<td>5</td>
<td>26/8/13</td>
<td>Science 1</td>
<td>Camilla Gordon</td>
<td>Weekly posting due by 12 midday Friday 30\textsuperscript{th} August</td>
</tr>
<tr>
<td>6</td>
<td>2/9/13</td>
<td>Science 2</td>
<td>Camilla Gordon</td>
<td>Assignment One Due- Friday 31\textsuperscript{st} August, 2pm</td>
</tr>
<tr>
<td>7</td>
<td>9/9/13</td>
<td>Science 3</td>
<td>Camilla Gordon</td>
<td>Weekly posting due by 12 midday Friday 13\textsuperscript{th} September</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Activity</td>
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<tr>
<td>8</td>
<td>30/9/13</td>
<td>No Classes – study week. Assignment 1 due before 5pm Thursday 3rd October</td>
<td></td>
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<tr>
<td>9</td>
<td>7/10/13</td>
<td>Maths 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Kate Highfield</td>
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<td></td>
<td></td>
<td>Weekly posting due by 12 midday Friday 11th October</td>
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<tr>
<td>10</td>
<td>14/10/13</td>
<td>Maths 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Kate Highfield</td>
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<tr>
<td></td>
<td></td>
<td>Weekly posting due by 12 midday Friday 18th October</td>
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<tr>
<td>11</td>
<td>21/10/13</td>
<td>Maths 3</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Kate Highfield</td>
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<tr>
<td></td>
<td></td>
<td>Assignment Two Due- Friday 26th October, 2pm</td>
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<td></td>
<td></td>
<td>Weekly posting due by 12 midday Friday 25th October</td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>28/10/13</td>
<td>ECED 603 Prac – no tutorials or reading tasks</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Assignment 2 due before 5pm Thursday 31st October</td>
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</tbody>
</table>
Learning and Teaching Activities

Weekly readings
Each week students are presented with a collection of readings (including compulsory and optional choice). Students are encouraged to engage and read these each week to develop key content understandings.

Weekly online discussion
Each week students engage with a range of online discussions, these are supported by video provocations, images and links to key literature to support discussion and learning community.

Workshops
Weekly workshops are available for internal students, or an on campus day for external students. These days provide access to and opportunity to engage with hands on resources and materials.

Assessment tasks
Assessment tasks have been designed to promote engagement with all reading, online discussion and workshop content. Task have been facilitated to promote choice by the student and cater to a range of learning styles and interests.

Policies and Procedures
Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:


In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Support
Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: [http://students.mq.edu.au/support/](http://students.mq.edu.au/support/)
UniWISE provides:

- Online learning resources and academic skills workshops [http://www.students.mq.edu.au/support/learning_skills/]
- Personal assistance with your learning & study related questions.
- The Learning Help Desk is located in the Library foyer (level 2).
- Online and on-campus orientation events run by Mentors@Macquarie.

Student Enquiry Service
Details of these services can be accessed at [http://www.student.mq.edu.au/ses/].

Equity Support
Students with a disability are encouraged to contact the [Disability Service](http://www.student.mq.edu.au/ses/) who can provide appropriate help with any issues that arise during their studies.

IT Help
If you wish to receive IT help, we would be glad to assist you at [http://informatics.mq.edu.au/help/].

When using the university's IT, you must adhere to the [Acceptable Use Policy](http://informatics.mq.edu.au/help/). The policy applies to all who connect to the MQ network including students and it outlines what can be done.

Graduate Capabilities

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 learning
- Evaluate a variety 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, analyse and synthesise a wide range of current research literature
- Identify problems or issues of relevance to early childhood mathematics, science, and technology education
• Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community

**Assessment tasks**

• Assessment 2
• Weekly online posts
• Assessment 1

**Learning and teaching activities**

• Each week students are presented with a collection of readings (including compulsory and optional choice). Students are encouraged to engage and read these each week to develop key content understandings
• Each week students engage with a range of online discussions, these are supported by video provocations, images and links to key literature to support discussion and learning community.
• Weekly workshops are available for internal students, or an on campus day for external students. These days provide access to and opportunity to engage with hands on resources and materials
• Assessment tasks have been designed to promote engagement with all reading, online discussion and workshop content. Task have been facilitated to promote choice by the student and cater to a range of learning styles and interests

**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**

• Examine the role of play in children’s mathematics, science and technology learning
• Evaluate a variety 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, analyse and synthesise a wide range of current research literature
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Assessment tasks

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• Assessment 1

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  community.
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  discussion and workshop content. Task have been facilitated to promote choice by the
  student and cater to a range of learning styles and interests

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

• Demonstrate a fundamental understanding of the major theoretical developments in
  early childhood mathematics, science and technology education
• Evaluate a variety 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
• Identify strategies to successfully link mathematics, science and technology learning to
  the child’s home environment and community

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• Weekly online posts
• Assessment 1
Learning and teaching activities

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• Assessment tasks have been designed to promote engagement with all reading, online discussion and workshop content. Task have been facilitated to promote choice by the student and cater to a range of learning styles and interests

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 learning
• Evaluate a variety 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
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• Assessment tasks have been designed to promote engagement with all reading, online discussion and workshop content. Task have been facilitated to promote choice by the student and cater to a range of learning styles and interests.

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

• Evaluate a variety 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.
• Identify strategies to successfully link mathematics, science and technology learning to the child’s home environment and community.

Assessment tasks

• Assessment 2
• Assessment 1

Learning and teaching activities

• Each week students engage with a range of online discussions, these are supported by video provocations, images and links to key literature to support discussion and learning community.
• Assessment tasks have been designed to promote engagement with all reading, online
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 learning
• Evaluate a variety 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
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