



# EDST2140

## STEAM Integration in the Early Years

Session 2, In person-scheduled-weekday, North Ryde 2024

*Macquarie School of Education*

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#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Unit Convenor

Emma Sutherland

[emma.sutherland@mq.edu.au](mailto:emma.sutherland@mq.edu.au)

Contact via Contact via iLearn Dialogue

25b Wally's Walk, Level 6 West, D 9

By Appointment - please note I work part time

Credit points

10

Prerequisites

40cp at 1000 level or above including ECHE1130 or ECH113

Corequisites

Co-badged status

Unit description

This unit explores the integration of science, technology, engineering, arts and mathematics (STEAM) in the early years of education (birth-eight). Students will gain understanding of the underlying pedagogies when engaging with STEAM, will learn to expand curriculum opportunities in formal and informal contexts (e.g. Maker spaces; Museums) and also differentiate their teaching strategies depending on the age and other important characteristics of their children/students. Contemporary methods of assessment, evaluation and documentation appropriate for young children will also be explored. Students will have the opportunity to design and implement their own educational resource with a focus on STEAM.

## 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:

**ULO1:** Describe the major theoretical developments in early childhood arts, mathematics, science and technology education.

**ULO2:** Critically engage with and reflect on research of how young children understand and progress in their mathematical, scientific and technological thinking, starting from

birth.

**ULO3:** Design, implement and evaluate effective teaching resources and learning environments using knowledge of the Early Years Learning Framework and the Primary Syllabuses (K-2) (ACARA/NESA).

**ULO4:** Integrate digital technologies, arts and design principles within effective teaching and learning strategies to expand learning opportunities for children in arts, mathematics, science and technology education.

**ULO5:** Critically analyse and demonstrate safe and ethical use of digital technologies in planning and teaching as a responsible local and global citizen.

## General Assessment Information

- Students should be aware of and apply the University policy on academic honesty (see: <https://policies.mq.edu.au/document/view.php?id=3>)
- Unless a Special Consideration (see: <https://students.mq.edu.au/study/assessment-exams/special-consideration>) request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a mark of, 0 (zero) will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55pm. A 1-hour grace period is provided to students who experience a technical issue. This late penalty will apply to non-timed sensitive assessment (incl essays, reports, posters, portfolios, journals, recordings etc).
- Late submission of time sensitive tasks (such as tests/exams, performance assessments/presentations, scheduled practical assessments/labs etc) will only be addressed by the unit convenor in a Special consideration application. Special Consideration outcome may result in a new question or topic.
- Please format assessments using 12-point font and 1.5 spacing.
- All assessments are submitted electronically. Turnitin plagiarism detection software is used to check all written assessments.
- Students can use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.
- Students should carefully check that they submit the correct file for an assessment as no re-submissions will be accepted after the due date and time, including instances where students upload an incorrect file in error.
- Word limits are strictly applied. Work above the word limit will not be marked.

- All assessments are marked using a clear marking scheme or a rubric.
- Marking of all assessments is moderated by the Unit Convenor.
- Applications for extensions must be made via AskMQ (<https://ask.mq.edu.au/>).
- It is **not the responsibility** of unit staff to contact students who have failed to submit assessments. If you have any missing items of assessment, it is your responsibility to make contact with the unit convenor.

### **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. For Professional Experience (PEX) units the PE Report is marked as satisfactory or unsatisfactory and the Teaching Performance Assessment (in final PE units) is marked as not meets, meets or exceeds.

#### **Descriptive Criteria for awarding grades in the unit**

To meet the unit outcomes and successfully pass this unit, students should attempt all assessment tasks.

Grade	Descriptor
<b>HD</b> (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.
<b>D</b> (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.
<b>Cr</b> (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.
<b>P</b> (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

<b>F</b> (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.
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Note: *If you fail a unit with a professional experience component, the fail grade will be on your transcript irrespective of the timing of the placement.*

### **Withdrawing from this unit**

If you are considering withdrawing from this unit, please seek academic advice via <https://ask.mq.edu.au> before doing so as this unit may be a co-requisite or prerequisite for units in the following sessions and may impact your course progression.

### **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 <https://ask.mq.edu.au>

### **Academic Integrity**

In accordance with the Academic Integrity Policy a student must take responsibility, be proactive, take ownership and hold oneself responsible for ensuring all information and content, including citations and references in their assessment, have been generated and communicated in an ethical, honest and responsible manner. Failure to show responsibility by checking the accuracy and integrity of your own content, citations and references, or the submission of falsified content, is a breach of the Academic Integrity Policy. The use of AI tools, such as ChatGPT, should not be used to generate any part of a submitted assessment. Assessments should not include any content or ideas generated by third parties or artificial intelligence sources.

## **Assessment Tasks**

Name	Weighting	Hurdle	Due
<a href="#">Development of STEAM learning plans</a>	50%	No	23:55, 02/09/2024
<a href="#">STEAM resource and learning experience development</a>	50%	No	23:55, 19/10/2024

## Development of STEAM learning plans

Assessment Type <sup>1</sup>: Learning plan

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **23:55, 02/09/2024**

Weighting: **50%**

The purpose of this assignment is to develop your knowledge and skills in observing, assessing and planning STEAM learning experiences for young children (birth-five years) in the early years. (1800 words)

On successful completion you will be able to:

- Describe the major theoretical developments in early childhood arts, mathematics, science and technology education.
- Critically engage with and reflect on research of how young children understand and progress in their mathematical, scientific and technological thinking, starting from birth.
- Design, implement and evaluate effective teaching resources and learning environments using knowledge of the Early Years Learning Framework and the Primary Syllabuses (K-2) (ACARA/NESA).

## STEAM resource and learning experience development

Assessment Type <sup>1</sup>: Project

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **23:55, 19/10/2024**

Weighting: **50%**

The purpose of this assignment is to develop your knowledge and skills in designing and planning a STEAM educational project for young children in the early years. (1800 words).

On successful completion you will be able to:

- Integrate digital technologies, arts and design principles within effective teaching and learning strategies to expand learning opportunities for children in arts, mathematics, science and technology education.
- Critically analyse and demonstrate safe and ethical use of digital technologies in planning and teaching as a responsible local and global citizen.

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment

- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

### **Required and recommended texts**

This unit contains both required and recommended readings. Those students who do not have prior learning from previously completed math, science or art units, may need to engage in additional research to support their understanding of the concepts and processes.

The following texts are **essential** for this unit.

**MacDonald, A., & Rafferty, J. (2021). *Investigating mathematics, science and technology in early childhood*. Oxford University Press.**

**Forbes, A., Chandra, V., Pfeiffer, L., & Sheffield, R. (2021). *STEM education in the primary school: A teacher's toolkit*. Cambridge University Press.**

Please note: books are available both in print and online format, rental options of texts are also available via VitalSource and Oxford University Press.

These texts will assist you in this unit as well as future units and your future career as educators.

### **Information about the unit iLearn site**

This unit has a full web presence through iLearn.

Students will need regular access to a computer and the Internet to complete this unit. Students enrolled for online classes will also need a functioning web camera. Students will be required to have their cameras on for the online classes as this supports engagement. If students do not have this technology, they should enrol in the face-to-face classes.

Weekly access to iLearn is compulsory for all students. Important assessment information will be posted here, as will other relevant unit notices and materials, including a reading template and guide to lecture note taking to assist your studies.

Weekly lectures are available on the web through the ECHO360 lecture component. You must listen to all lectures.

PowerPoint slides are available in iLearn in advance of the weekly lecture.

Students will access the required readings from the Leganto link on the unit iLearn page and engage in independent research. These are essential for successful completion of the assessments. Students are expected to stay up to date with required weekly lectures and readings.

### **Access and technical assistance**

Information for students about access to the online component of this unit is available at <https://ilearn.mq.edu.au/login/index.php>. You will need to enter your student username and password.

Please do **NOT** contact the Unit Convenor regarding *iLearn* technical help.

Assistance is available from IT Helpdesk

Ph: 9850 4357 or 1800 67 4357

Log a request: [help.mq.edu.au](http://help.mq.edu.au).

On Campus: Ground floor at 18 Wally's Walk

## **Structure**

The unit structure can be found in the university timetable [Creating your timetable - Enrolling | Macquarie University, Sydney \(mq.edu.au\)](#)

The unit comprises one lecture (prerecorded) and one two-hour tutorial for internal students and external students.

In the tutorial, students will discuss issues and questions arising from the lectures and prescribed readings of the week prior. You are required to participate in small group activities and whole class activities and discussion, and to read the weekly material and watch the lecture in advance (ensure you set aside enough time to complete these tasks and take notes). You are expected to base your arguments/ discussions on evidence from published research and other relevant material.

Attendance at all tutorials is expected and the roll will be taken. Students are required to attend the tutorial in which they are enrolled. Any changes to tutorial enrolments must be completed officially through e-student. Please do not contact the unit convenor requesting a change.

## **Unit Schedule**

This is a unit overview only. The weekly program for the course with the accompanying readings/ preparation is available on the unit iLearn site.

<b>Week</b>	<b>Topic</b>
<b>Week 1</b>	Introduction to STEAM Education
<b>Week 2</b>	Mathematics Education in Early Childhood
<b>Week 3</b>	Science in the EYLF and Australian Curriculum
<b>Week 4</b>	Technology Education in the Early Years
<b>Week 5</b>	Arts Education in the Early Years
<b>Week 6</b>	Engineering in Early Childhood Education
<b>Week 7</b>	Play-based approach to STEAM Education <b>Assessment 1: Development of STEAM Learning Plans( 50%) due 23:55 Monday 2<sup>nd</sup> September</b>



Week 8	Project approach to STEAM
	<b>MQ Recess: Mid-Session Break (2 weeks)</b>
Week 9	Planning and Assessment for STEAM Education
Week 10	Makerspaces in STEAM Education
Week 11	<b>Assessment 2: STEAM Resource and Learning Experience Development (50%) due 23:55 Saturday 19<sup>th</sup> September</b>

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

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

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 [connect.mq.edu.au](https://connect.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

### **School of Education Procedures**

In addition, the following policies and procedures of the School of Education are applicable in this unit.

### **Attendance for undergraduate units**

See the university timetable for information about when classes begin in this unit. [Creating your timetable - Enrolling | Macquarie University, Sydney \(mq.edu.au\)](#)

Activities completed during weekly tutorials (DAY or ONLINE DAY mode) or on campus days (INFQ mode) are essential for building the core knowledge and/or skills required to demonstrate the learning outcomes of this unit [and to meet the AITSL Graduate Teacher Standards and/or ACECQA requirements]. Attendance at all tutorials or on campus days is expected and the roll will be taken. Make up tasks may be given if attendance is missed to ensure all content is covered to meet accreditation requirements.

Students are required to attend the tutorial in which they are enrolled. Any changes to tutorial enrolments must be completed officially through e-student. Please do not contact the unit convenor requesting a change.

### **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

### **Fail Rule**

This unit is a part of a professional course listed on Schedules 2 and 3 of the Academic

Progression Policy. This course has additional requirements that are applicable for the full duration of the course, including course-specific inherent requirements, Fitness to Practice requirements and other compulsory course requirements. It also has rigorous academic progression standards. Inability to meet these requirements may result in a withdrawal of offer of admission and/or permanent exclusion from the course in accordance with the General Coursework Rules.

## Student Support

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

### The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

## Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## 5Rs Framework

### 5Rs Framework

The 5Rs Framework, developed by the School of Education at Macquarie University, is embedded throughout your teacher education course.

Your use of the 5Rs Framework will help you develop the capabilities that will make your teaching career sustainable and fulfilling.

In this unit, you will learn using the 5Rs framework in the following important ways:

**Resilience:** Understanding and identifying personal attitudes towards STEAM education. Challenging pre-existing STEM education. Building conceptual and procedural understandings to bolster confidence.

**Reflexive:** Strong understanding of theory to underpin pedagogy. Understanding broader implications of technology and how this influences teaching and learning decisions.

**Responsive:** Building passion, interest and enthusiasm for STEAM learning and developing strategies for supporting this with young children and families. Recognising how children's interest in STEAM areas is an important as an impetus for curriculum planning/ implementation.

**Ready to learn:** Reinforcing the teacher's role as a facilitator and co-learner, learning alongside children on integrated STEAM content. Understanding technology as tool for teaching and learning.

**Research engaged:** Drawing on research publications and research to understand teaching and learning relating to STEAM.

## Changes since First Published

Date	Description
09/07/2024	Required texts amended.
09/07/2024	The weekly schedule has been amended in weeks 9, 10 and 11.

Unit information based on version 2024.01R of the [Handbook](#)