



EDST8213

Science, Technology and Mathematics Specialisation

Session 2, Infrequent attendance, North Ryde 2021

Macquarie School of Education

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).



Visit the [MQ COVID-19 information page](#) for more detail.

General Information

Unit convenor and teaching staff

Garry Falloon

garry.falloon@mq.edu.au

Contact via Via email

29WW Room 219

As arranged via email

Credit points

10

Prerequisites

EDST8205 and EDST8211

Corequisites

Co-badged status

Unit description

This unit builds understanding of subject-based and interdisciplinary approaches to STEM education, and how STEM literacy can be developed through project, problem and scenario-based learning designs in primary classrooms. It takes a holistic perspective on the nature of STEM literacy, explores why developing it is important in terms of future learning (or 'soft' skill development) and practical and cognitive capabilities, and investigates its relationship with design thinking and the Design and Production strand of the K-6 Science and Technology syllabus. The unit will engage students in a range of practical tasks that develop understanding of the contribution of different knowledges applied to STEM-based innovations, products, services and systems in 'real world' contexts. It will also introduce different approaches to planning STEM, focusing on cross-curricula integrated models.

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: Evaluate the integrated nature of STEM teaching, learning and curriculum.

ULO2: Analyse the research foundations of the STEM thinking of students and STEM practice in primary schools.

ULO3: Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.

ULO4: Critically reflect upon and research the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.

ULO5: Demonstrate oral communication skills, listening skills, and teamwork skills appropriate to a range of professional educational purposes and audiences.

General Assessment Information

Assessment Presentation and 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 responsibility 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,
- Students are responsible for checking that their submission has been successful and has been submitted by the due date and time.

Assignment extensions and late penalties

- In general, there should be no need for extensions except through illness or misadventure that would be categorised as serious and unavoidable disruption according to the University definition of same, see: <https://students.mq.edu.au/study/my-study-program/special-consideration>
- Applications for extensions must be made via AskMQ according to the Special Consideration

policy. 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.

- Late submissions: Unless a Special Consideration request has been submitted and approved, (a) a penalty for lateness will apply - 10/100 marks of credit (10% of the total assessment weighting) will be deducted per day for assignments submitted after the due date – and (b) no assignment will be accepted seven days (incl. weekends) after the original submission deadline. No late submissions will be accepted for timed assessment - e.g. quizzes, online tests. A zero result for the assignment will be recorded after the late submission period has ended if no task has been received.
- 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 re-assessment 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:

- Please do not request a re-mark for a Failed assessment as they are all double-marked as a part of the moderation process.
- The outcome of a re-mark may be a higher/lower or unchanged grade.
- Grades are standards referenced and effort is NOT a criterion

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.

Descriptive Criteria for awarding grades in the unit

In order to meet the unit outcomes and successfully pass this unit, students must make a genuine attempt at all assessment tasks. Where any submitted assessment task is considered to be unsatisfactory in this regard, the highest possible final grade that can be awarded for the unit will be 45.

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.

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 on your progression through the degree.

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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Understanding the rationale for STEM education in schools	40%	No	17:00 24/09/2021

Name	Weighting	Hurdle	Due
<u>A collaborative STEM investigation</u>	60%	No	17:00 05/11/2021

Understanding the rationale for STEM education in schools

Assessment Type **1**: Report

Indicative Time on Task **2**: 30 hours

Due: **17:00 24/09/2021**

Weighting: **40%**

Research and write a report (approx. 1500 words) summarising the key arguments and rationale supporting interdisciplinary STEM education in schools. The report should communicate understanding of the relationship between interdisciplinary project and problem based approaches to STEM and development of 21st Century or future-focused skills, competencies and STEM discipline knowledge. The report should draw implications from the research for teachers, particularly focusing on curriculum and learning designs and pedagogical approaches supportive of effective STEM teaching and learning in primary classrooms.

On successful completion you will be able to:

- Evaluate the integrated nature of STEM teaching, learning and curriculum.
- Analyse the research foundations of the STEM thinking of students and STEM practice in primary schools.
- Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.
- Critically reflect upon and research the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.

A collaborative STEM investigation

Assessment Type **1**: Project

Indicative Time on Task **2**: 40 hours

Due: **17:00 05/11/2021**

Weighting: **60%**

In pairs, research, design, plan, implement and evaluate a defined STEM-based 'micro-project' that involves the integration of STEM and other knowledges and follows a problem-based design. The project should be authentic - that is, based on a real problem, need, want or opportunity. An assessment digital portfolio or website will be produced containing background

research setting the context for the problem (etc.) for example - the history, rationale, background etc.; a brief plan of action (what is the plan to solve the problem?); a summary of materials or resources used (physical, informational, personnel etc); evidence of implementation, and an evaluation of the effectiveness of the process used and resulting outcome. The assessment digital portfolio or website must utilise different media (e.g., short video clips, images, concept maps) and be made easily accessible for marking purposes. The content of the digital portfolio or website must be concise, well organised under each of the above sections, and contain a brief (500 word) reflective statement summarising personal learning from this task in relation to the rationale, goals and purpose of STEM education, as investigated in Assignment 1. A separate reflective statement is required for each group member.

On successful completion you will be able to:

- Evaluate the integrated nature of STEM teaching, learning and curriculum.
- Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.
- Critically reflect upon and research the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.
- Demonstrate oral communication skills, listening skills, and teamwork skills appropriate to a range of professional educational purposes and audiences.

¹ 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.

² 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

Delivery and Resources

This unit has mandatory learning tasks posted on iLearn. Students will need regular access to a computer and the Internet to complete this unit.

Weekly access to iLearn is compulsory for all students. Important learning tasks and assessment information will be posted there, as will other relevant unit notices and materials. Various activities and materials for discussion and critical reflection are also included on the site. Electronic links and suggested references will be included in the Resources section. Please check the iLearn unit site regularly.

Workshops and online asynchronous interaction

There are four Saturday morning workshops scheduled for this unit, supported by iLearn online tasks and activities. It is expected students will fully engage with, attend and complete all workshops and weekly tasks.

Access and technical assistance

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

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

No extensions will be given for any technical issues. Allow enough time for your submissions.

Assistance is available from IT Helpdesk ph: 1800 67 4357, or log a request at help.mq.edu.au. OneHelp is the online IT support service for both students and staff.

This unit requires students to use several ICT and software skills:

- **Internet access:** The iLearn site contains materials for this unit. It is also required for the online submission of all Assessment Tasks, and for Turnitin submission for ALL tasks.
- **Word processing, visual representations, and document formatting:** You are required to use an appropriate form of software to present your assignments.
- **Uploading** of assessment tasks to iLearn

Unit Schedule

EDST8213: Weekly Schedule

Week	Workshop and online content
Week 1: Understanding the nature of STEM and STEM Education	This first week our unit revises key ideas relating to the nature of STEM education. We begin by revising concepts introduced in EDST8205 relating to different definitions and approaches to STEM education, and why STEM is viewed as an important area of learning in primary schools. The online activities and tasks supplement practical work completed in the first Saturday morning workshop.
Week 2: Computational Thinking, Coding, Robotics and STEM	Week 2 begins by investigating the nature and elements of Computational Thinking as a systematic approach to problem solving, and arguments supporting it as a 21st Century learning competency. The relationship between computational thinking and coding is explored, and evidence indicating the value of coding activities for general thinking capability development is introduced and discussed. As for Module 1, online activities supplement practical work completed in the Saturday morning workshops.
Weeks 3- 7	Practicum (no classes)
Recess	13-24 September

<p>Week 8:</p> <p>Project and problem-based Learning in STEM</p>	<p>In week 8 we will examine the foundations of project-based learning, exploring in depth the relationship between this approach to STEM and the development of STEM knowledge, skills and more general key competencies and curriculum capabilities.</p>
<p>Week 9:</p> <p>Online checkpoint seminars for assignment 2.</p>	<p>Project checkpoint seminar presentations online 5 October @ 7.30pm (see iLearn for further details)</p> <p>Zoom meeting room: https://macquarie.zoom.us/j/84677574478?pwd=SmJpSGIDL0hCSnptZGx0OVZjaXN5UT09</p> <p>Passcode: 869006</p>
<p>Week 10:</p> <p>Partnerships and authentic contexts supporting STEM education</p>	<p>A key consideration in the design of interdisciplinary STEM education programs is the importance of ensuring projects are authentic and wherever possible, based on 'real world' problems, needs or opportunities. At primary school level, the school and its community can be a rich source of STEM learning scenarios, as well as providing more direct support for classroom learning programs. This week we will explore examples of STEM-supportive partnerships or relationships in schools, and investigate opportunities presented by local events to act as 'springboards' for STEM units.</p>
<p>Week 11:</p> <p>Approaches to planning, assessment, recording and reporting in STEM</p>	<p>This week we will be exploring different approaches to planning and assessing STEM, including but not limited to interdisciplinary approaches. We will investigate the types of data useful for assessing STEM and how to collect and report on it. It will specifically focus on the importance of formative, self and peer assessment methods for capturing information on learning processes as well as 'end product'.</p>
<p>Weeks 12 & 13:</p> <p>Digital artefact and associated information development</p>	<p>These two weeks will be allocated to finalising the digital artefact and associated information (assessment task 2) due for submission before Friday 5 November at 5pm.</p>

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](#)
- [Grade Appeal Policy](#)

- [Complaint Management 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 ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

School of Education Procedures

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

Attendance for Master of Teaching (Primary) students Attendance at all synchronous activities (such as scheduled in person or Zoom tutorials), viewing of lectures, completion of class tasks and involvement in professional forums is compulsory as the Master of Teaching is a professional NESA accredited qualification. All MTeach students must meet 80% of this attendance requirement.

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

All Students

1. The on-campus sessions on July 31, August 7, October 9 and October 16 are essential to student engagement and learning and attendance on all days is expected. Failure to attend or to have an approved Special Consideration may result in a Fail grade for the unit. Please see attendance requirements in this unit guide.
2. Prior to the on-campus sessions, you should have read the prescribed readings and listened to the lectures. Summarise the main points and make a note of the key terms and definitions. Prepare any discussion questions of your own that you wish to share.
3. Please make effective use of the online component of the unit and access iLearn regularly. Keep up to date with listening to the lectures on a weekly basis.

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 help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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

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

If you are a Global MBA student contact globalmba.support@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.

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:

- Learning from research to build professional knowledge
- Resilience through practice in solving and developing solutions to ill structured problems.