EDUC359

Frontiers in Science, Technology, Engineering and Mathematics (STEM) Education

S2 Online 2018

Department of Educational Studies

Contents

General Information

Unit convenor and teaching staff

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Credit points
3

Prerequisites
39cp

Corequisites

Co-badged status

Unit description
This unit is designed for pre-service early childhood, primary and secondary teachers interested in Science Technology Engineering and Mathematics (STEM) education and other students preparing to engage in STEM-related and science communication professions. Six themes are addressed: the development of STEM literacies; students' learning of STEM-related concepts; professional programs addressing STEM initiatives; the impact of technologies in developing STEM teaching and learning; the relation of STEM to health education, and the role of STEM in curriculum change. There is a common lecture strand that examines current research perspectives on key issues of STEM education in a global society. Students may choose a specialised assignment focused on science, technology, engineering or mathematics or STEM-related health education. This unit is compulsory for students enrolled in specialisations in primary mathematics or science pre-service teacher education.

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:

Reflect critically on current research evidence informing key issues in STEM education

Demonstrate critical awareness of scientific approaches and contemporary applications of STEM in a global society

Develop communication strategies for articulating STEM literacies across a range of contexts

Critically evaluate programs and initiatives addressing STEM innovations in Australia

Evaluate the impact of digital technologies in developing STEM and STEAM teaching and learning approaches and programs

Develop a rationale for leadership and curriculum change in STEM education.

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 Tasks

Name	Weighting	Hurdle	Due
Reflective journal / blog	15%	No	Friday, August 24 at 8 a.m.
Case study report	45%	No	Friday Oct 12 at 8 a.m.
Examination	40%	No	Exam week

Reflective journal / blog

Due: **Friday, August 24 at 8 a.m.**
Weighting: **15%**

Critically review government policy, programs and research evidence to identify the role of STEM in a global society raised in Topics 1-4

On successful completion you will be able to:

- Reflect critically on current research evidence informing key issues in STEM education
- Demonstrate critical awareness of scientific approaches and contemporary applications of STEM in a global society
- Critically evaluate programs and initiatives addressing STEM innovations in Australia
- Evaluate the impact of digital technologies in developing STEM and STEAM teaching and learning approaches and programs
- Develop a rationale for leadership and curriculum change in STEM education.

Case study report

Due: **Friday Oct 12 at 8 a.m.**
Weighting: **45%**

Conduct a case study of a STEM-related educational context either through observation and participation within a school or out of school environment

On successful completion you will be able to:

- Develop communication strategies for articulating STEM literacies across a range of contexts
- Critically evaluate programs and initiatives addressing STEM innovations in Australia
- Evaluate the impact of digital technologies in developing STEM and STEAM teaching and learning approaches and programs
- Develop a rationale for leadership and curriculum change in STEM education.

Examination

Due: **Exam week**
Weighting: **40%**

15 questions on key issues and readings for topics 5-12

On successful completion you will be able to:

- Reflect critically on current research evidence informing key issues in STEM education
- Demonstrate critical awareness of scientific approaches and contemporary applications of STEM in a global society
- Critically evaluate programs and initiatives addressing STEM innovations in Australia
- Evaluate the impact of digital technologies in developing STEM and STEAM teaching and learning approaches and programs

Delivery and Resources

EDUC359 will be delivered fully on-line

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).

Student Code of Conduct

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

Results

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

Student Support

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

Learning Skills

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

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

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

Student Enquiries

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

IT Help

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

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

Graduate Capabilities

Creative and Innovative

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

This graduate capability is supported by:

Learning outcome

- Develop a rationale for leadership and curriculum change in STEM education.

Assessment task

- Case study report

Capable of Professional and Personal Judgement and Initiative

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

This graduate capability is supported by:

Learning outcome

- Evaluate the impact of digital technologies in developing STEM and STEAM teaching and learning approaches and programs

Assessment task

- Examination

Discipline Specific Knowledge and Skills

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

This graduate capability is supported by:

Learning outcome

- Demonstrate critical awareness of scientific approaches and contemporary applications of STEM in a global society

Assessment task

- Case study report

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcome

- Critically evaluate programs and initiatives addressing STEM innovations in Australia

Assessment task

- Reflective journal / blog

Problem Solving and Research Capability

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

This graduate capability is supported by:

Learning outcome

- Reflect critically on current research evidence informing key issues in STEM education

Assessment task

- Case study report

Effective Communication

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

This graduate capability is supported by:

Learning outcome

- Develop communication strategies for articulating STEM literacies across a range of contexts

Assessment task

- Reflective journal / blog

Changes from Previous Offering

This is the first time EDUC359 has been offered so there are no changes.