EDCU12038 *Teaching for Mathematical Proficiency*
Term 2 - 2020

Profile information current as at 10/04/2024 09:11 pm

General Information

Overview

Teaching for Mathematical Proficiency focuses on the development of professional knowledge that supports the teaching of Mathematics in primary schools in this unit. Students explore Mathematics content and experiment with pedagogical approaches for teaching mathematical reasoning and understanding. They evaluate the effect of ICTs and a range of resources, learning processes and teaching strategies on the development of mathematical proficiency. Students are introduced to the rationale, organisation and content of the Australian Curriculum: Mathematics and design plans for learning and teaching mathematical concepts and skills appropriate for specific year levels in the primary school. They explain and justify approaches to promoting numeracy development through reference to authoritative sources and identify strategies for informing and involving parents and carers in the educative process. Students demonstrate effective pedagogy in Mathematics through role play of examples of classroom practice including the use of ICTs to support mathematical understanding.

Details

Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *7*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

There are no requisites for this unit.
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 2 - 2020

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Noosa
- Online
- Rockhampton
- Townsville

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Practical and Written Assessment**
Weighting: 50%
2. **Presentation**
Weighting: 50%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Moodle feedback

Feedback
Assessment tasks

Recommendation
Review task requirements and marking criteria

Feedback from Moodle feedback

Feedback
Assignment return

Recommendation
Adhere to 2 week marking turnaround

Feedback from Moodle feedback

Feedback
Textbook

Recommendation
Retain the same textbook

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Reflect critically on approaches to teaching Mathematics to improve professional knowledge and practice
2. Apply research on effective practice to justify pedagogy that improves students' mathematical proficiency and understanding of core concepts
3. Recommend strategies, resources and learning activities that aid the transfer of mathematical understanding to real world contexts
4. Evaluate the content, skills and teaching strategies of the learning area to identify ICTs and other resources that enhance understanding, fluency and reasoning in Mathematics
5. Design well-structured lessons that engage learners in actively applying key mathematical skills to understand the content
6. Use strategies that contribute to effective partnerships with parents/ carers in supporting students' numeracy development
7. Engage in opportunities for sharing and enhancing professional knowledge and practice through reflection and collaboration.

Successful completion of this unit provides opportunities for students to engage with the Australian Professional Standards for Teachers (Graduate Career Stage) focus areas of:
1.2 Understand how students learn
2.1 Content and teaching strategies of the teaching area
2.5 Literacy and numeracy strategies
2.6 Information and Communication Technology (ICT)
3.3 Use teaching strategies
3.4 Select and use resources
3.6 Evaluate and improve teaching programs
3.7 Engage parents/carers in the educative process
6.2 Engage in professional learning and improve practice
7.3 Engage with the parents/carers

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | • Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Practical and Written Assessment - 50%	•	•		•	•		•
2 - Presentation - 50%		•	•	•		•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Communication	•	•				•	•
2 - Problem Solving			•	•	•	•	
3 - Critical Thinking	•	•	•	•	•	•	•
4 - Information Literacy		•		•			
5 - Team Work				•		•	•
6 - Information Technology Competence				•		•	•
7 - Cross Cultural Competence						•	
8 - Ethical practice							
9 - Social Innovation							
10 - Aboriginal and Torres Strait Islander Cultures							

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Practical and Written Assessment - 50%	•	•	•	•		•				
2 - Presentation - 50%	•	•	•	•	•	•				

Textbooks and Resources

Textbooks

EDCU12038

Prescribed

Helping Children Learn Mathematics
Edition: 2nd edn AU (2017)
Authors: Reys, RE, Lindquist, M, Lambdin, DV, Smith, NL, Rogers, A, Falle, J, Frid, S & Bennett, S
John Wiley and Sons
Milton , Qld , Australia
ISBN: 9780730350675
Binding: Paperback

Additional Textbook Information
If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code). eBooks are available at the publisher's website.

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: American Psychological Association 7th Edition (APA 7th edition)
For further information, see the Assessment Tasks.

Teaching Contacts

Mark Gronow Unit Coordinator
m.gronow@cqu.edu.au

Schedule

Week 1 - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Introduction to EDCU12038 2. Mathematics in our world 3. Learning mathematics	Chapter 1 1. What is mathematics (Section 1.1) 2. Mathematics taught (Section 1.2) 3. Where you can get support (Section 1.3) Chapter 2 1. Supporting diverse learners (Section 2.1) 2. Procedural and conceptual knowledge (Section 2.2) 3. How do children learn mathematics (Section 2.3) 4. How to help children make sense of mathematics (Section 2.4)	

Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Planning and teaching mathematics 2. Assessment and feedback	Chapter 3 1. Effective planning and preparation (Section 3.1) 2. Planning for effective teaching (Section 3.2) 3. Levels of planning (Section 3.3) 4. Planning different lessons (Section 3.4) 5. Needs of students (Section 3.5) 6. Assessment of planning (Section 3.6) Chapter 4 1. Enhancing learning and teaching (Section 4.1) 2. Information on student learning (Section 4.2) 3. Assessing students' learning (Section 4.3) 4. Record keeping and communicating assessment (Section 4.4)	

Week 3 - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Doing mathematics 2. Problem solving	Chapter 5 1. Understanding (Section 5.1) 2. Fluency (Section 5.2) 3. Problem solving (Section 5.3) 4. Reasoning and Proof (Section 5.4) 5. Communication (Section 5.5) 6. Connections (Section 5.6) 7. Representations (Section 5.7) Chapter 6 1. What is problem solving (Section 6.1) 2. Teaching through problem solving (Section 6.2) 3. Strategies for problem solving (Section 6.3) 4. Looking back (Section 6.4) 5. Helping students to solve problems (Section 6.5)	

Week 4 - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Counting and number sense	Chapter 7 1. Developing number sense (Section 7.1) 2. Counting principles (Section 7.2) 3. Counting strategies (Section 7.3) 4. Cardinal, ordinal and nominal numbers (Section 7.4) 5. Writing numbers (Section 7.5)	

Week 5 - 10 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic

1. Place value and number sense	Chapter 8 1. Our number system (Section 8.1) 2. Nature of place value (Section 8.2) 3. Beginning place value (Section 8.3) 4. Consolidating place value (Section 8.4) 5. Extending place value (Section 8.5) 6. Reading and writing numbers (Section 8.6) 7. Rounding (Section 8.7)	

Break - 17 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 24 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. The four operations	Chapter 9 1. Number sense and computational fluency (Section 9.1) 2. Meaning of the four operations (Section 9.2) 3. Mathematical properties (Section 9.3) 4. Overview of basic facts (Section 9.4) 5. Thinking strategies (Section 9.5)	**Research Investigation (Evaluation of practice and planning**) Due: Week 6, 24 Aug 2020, 11:45 pm AEST **Research Investigation (Evaluation of practice and planning)** Due: Week 6 Monday (24 Aug 2020) 11:45 pm AEST

Week 7 - 31 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Mental Computation, calculators and estimation	Chapter 10 1. Calculators (Section 10.1) 2. Mental computation (Section 10.2) 3. Estimation (Section 10.3)	

Week 8 - 07 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Solving problems with written strategies	Chapter 11 1. Emergent understanding and experiences (Section 11.1) 2. Addition (Section 11.2) 3. Subtraction (Section 11.3) 4. Multiplication (Section 11.4) 5. Division (Section 11.5) 6. Finding the balance between practice and proficiency (Section 11.6)	

Week 9 - 14 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Fractions and decimals	Chapter 12 1. Concept of a fraction (Section 12.1) 2. Operation with fractions (Section 12.2) 3. Concept of a decimal (Section 12.3) 4. Operation with decimals (Section 12.4)	

Week 10 - 21 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic

1. Number theory	Chapter 14 1. Number theory in primary mathematics (Section 14.1) 2. Number theory topics for primary mathematics (Section 14.2) 3. Other number number theory topics (Section 14.3)	

Week 11 - 28 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
1. Pattern and algebraic thinking	Chapter 15 1. Problems, patterns and relations (Section 15.1) 2. Language and symbols of algebra (Section 15.2) 3. Modelling, generalising and justifying (Section 15.3)	

Week 12 - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Group presentations - Strategies for teaching numeracy		**Group Presentation - Justifying a pedagogical approach** Due: Week 12, Friday, 9 Oct 2020, 11:45 pm AEST **Group Presentation - Justifying a pedagogical approach** Due: Week 12 Friday (9 Oct 2020) 11:45 pm AEST

Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Research Investigation (Evaluation of practice and planning)

Assessment Type
Practical and Written Assessment

Task Description
Task rationale:
This assessment task builds professional knowledge and understanding of the content, structure, resources and teaching strategies of the Mathematics learning area. Opportunities to evaluate practice and apply professional learning to improve teaching and learning in Mathematics are also embedded in this assessment. The task can be used as evidence for demonstrating aspects of the Australian Professional Standards for Graduate Teachers focus areas 1.2, 2.1, 3.2, 3.6, 6.2.
Task description:

1. **Choose** a mathematics concept/s from the Number and Algebra Content Strand of *The Australian Curriculum: Mathematics* (ACARA, 2014) that is used in everyday situations (e.g. addition, subtraction, multiplication, or division of whole numbers, ratio, percentage, fractions, decimals).
2. Focusing on ONE mathematical concept only write a short **descriptive paragraph** that both **outlines** and **examines** your personal disposition towards the mathematics concept, your beliefs about who can learn mathematics and how learning occurs in mathematics. Your paragraph **could** include how you were taught this mathematics concept, how you have observed this mathematics concept taught in primary school, **or** how you think it should be taught. The purpose of this part of the task is to reveal and reflect on your experiences of mathematics teaching and learning.
3. **Investigate** how an understanding of the chosen concept is developed and the approach for teaching this concept by consulting *The Australian Curriculum: Mathematics* (ACARA, 2014), your set text and literature

related to Mathematics pedagogy.
4. Use the findings of this research to **critique** the approach to teaching and learning outlined in your descriptive paragraph.
5. **Develop** a full lesson plan for your mathematical concept that incorporates the pedagogy and resources you identified as effective in your investigation of the literature on teaching and learning mathematics. Your lesson plan should aim to develop understanding, reasoning or problem solving **NOT** fluency or consolidation.
6. **Justify** your lesson design choices through **reference** to the research literature and reading you did in the investigation.
7. **Reflect** on how your investigation improved your professional understanding of effective practice in the Mathematics learning area.

Submit your response to this task in the form of a **written report** of approximately **1500 words** using the following structure:

- Title page
- Contents page
- Introduction to the topic
- Results of the research investigation
- Critique of teaching approaches described in the paragraph
- Justification of pedagogy and resources in your lesson plan
- Reflection - reflect on the importance of your new professional knowledge and the process of investigating practice as a source of professional learning for teachers
- Conclusion
- List of References
- Appendix 1: Descriptive paragraph
- Appendix 2: Detailed lesson plan
- Appendix 3: Lesson plan resources

Assessment Due Date
Week 6 Monday (24 Aug 2020) 11:45 pm AEST
Please submit the task as one document with your name in the file name it is saved under.

Return Date to Students
Week 9 Friday (18 Sept 2020)
Feedback on this assessment response will be provided in sufficient time to allow for academic support and advice as necessary to inform students' responses to the next task.

Weighting
50%

Assessment Criteria
The full rubric for this assessment task can be downloaded from the Moodle site for this unit.
Assessment criteria

1.2 Understand how students learn
Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.

2.1 Content and teaching strategies of the teaching area
Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.

3.2 Plan, structure and sequence learning programs
Plan lesson sequences using knowledge of student learning, content and effective teaching strategies.

3.6 Evaluate and improve teaching programs
Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning.

6.2 Engage in professional learning and improve practice
Understand the relevant and appropriate sources of professional learning for teachers.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Submission Instructions
Please submit the task as one document with your name in the file name it is saved under.

Learning Outcomes Assessed

- Reflect critically on approaches to teaching Mathematics to improve professional knowledge and practice
- Apply research on effective practice to justify pedagogy that improves students' mathematical proficiency and understanding of core concepts
- Evaluate the content, skills and teaching strategies of the learning area to identify ICTs and other resources that enhance understanding, fluency and reasoning in Mathematics
- Design well-structured lessons that engage learners in actively applying key mathematical skills to understand the content
- Engage in opportunities for sharing and enhancing professional knowledge and practice through reflection and collaboration.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

2 Group Presentation - Justifying a pedagogical approach

Assessment Type
Presentation

Task Description
Task rationale
This assessment task provides opportunities for demonstrating knowledge of teaching strategies using ICTs to support the participation, concept development and mathematical proficiency of students. Strategies for engaging with parents and carers to support the educative process are also demonstrated in this task which can be used as evidence for demonstrating aspects of the Australian Professional Standards for Graduate Teachers focus areas 1.2, 2.1, 3.3, 3.4, 3.7 and 7.3.
Task description
In **small groups (2 to 4 members)**, create a presentation in the form of an **information session for parents** at a particular level of the primary school, e.g. early years, middle or upper primary.
Your presentation must respond to **one** of the **scenarios** concerning mathematics learning outlined on the Moodle site for this unit.
The presentation should **illustrate** and **explain** the reasons for the pedagogical approach advocated in response to the scenario and **propose** strategies to involve parents/care givers in the development of their child's numeracy.
Your presentation must also include **a demonstration of the use of ICTs to support learning in Mathematics,** describe how the tools could be used in the classroom and justify why they should be used.
The presentation will be of **15-20 minutes duration.**
On campus students - presentations will occur in week 12 during the scheduled tutorial time. Please note that you may be required to attend outside of tutorial time depending on the number of presentations at your campus site.
Distance students - presentations will occur during week 12. Distance students have the option to either

1. present during the scheduled tutorial time at the closest campus (subject to campus tutor agreement)
2. present using Zoom at a time negotiated with the tutor
3. record the presentation, upload to CloudStor and submit the link to the recorded presentation

Groups should use suitable presentation software to create support materials to accompany the oral presentation, including a **brochure/information sheet** or similar for parents outlining suggested strategies for supporting learning in the home.

Assessment Due Date
Week 12 Friday (9 Oct 2020) 11:45 pm AEST
Presentations will occur during scheduled tutorial and Zoom sessions or as negotiated with tutor. Each student must upload the Group participation sheet, word doc of presentation resources, and reference list by due date above irrespective of the date of the presentation.

Return Date to Students

Feedback on the final assessment task will be provided following moderation and prior to the date of certification of grades for the term.

Weighting
50%

Assessment Criteria

The full rubric for this assessment task can be downloaded from the Moodle site for this unit.

Assessment criteria

1.2 Understand how students learn
Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.
2.1 Content and teaching strategies of the teaching area
Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.
3.3 Use teaching strategies
Include a range of teaching strategies.
3.4 Select and use resources
Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning.
3.7 Engage parents/ carers in the educative process
Describe a broad range of strategies for involving parents/carers in the educative process.
7.3 Engage with the parents/carers
Understand strategies for working effectively, sensitively and confidentially with parents/carers.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Submission Instructions
Each group member must submit a single word document with their surname in the file name. Details of what to include in the document are outlined on the Moodle Assessment page.

Learning Outcomes Assessed

- Apply research on effective practice to justify pedagogy that improves students' mathematical proficiency and understanding of core concepts
- Recommend strategies, resources and learning activities that aid the transfer of mathematical understanding to real world contexts
- Evaluate the content, skills and teaching strategies of the learning area to identify ICTs and other resources that enhance understanding, fluency and reasoning in Mathematics
- Use strategies that contribute to effective partnerships with parents/ carers in supporting students' numeracy development
- Engage in opportunities for sharing and enhancing professional knowledge and practice through reflection and collaboration.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem