

MMTS103 Developing Applied Mathematical Tasks

ECTS Value: 4 ECTS
Self-Study Hours: 35

Contact Hours: 20
Assessment Hours: 45

Overall Objectives and Outcomes

This module will explore the impact of different teachers' perspectives to learning on the environment in the Maths classroom, the types of tasks that are set and the level of student engagement. This module will also cover the different frameworks for selecting mathematical tasks on the level of their cognitive demand and the alignment of applied mathematical tasks to learning intentions and success criteria.

By the end of this module, the learner will be able to:

Competences:

- recognise how different approaches to learning and teaching determine the roles of the teacher and learner in the classroom situation
- analyse tasks in order to determine the level of difficulty and complexity required to solve them
- analyse and sort tasks according to their level of cognitive demand
- create applied tasks that can be used in a local context identifying their level of difficulty, complexity and cognitive demand, learning intentions and the success criteria
- devise rubrics that can be used with tasks for summative/formative assessment

Knowledge:

- Identify the relationships between task related variables and student learning.
- Associate tasks with learning intentions and success criteria.
- Develop knowledge of how to construct rubrics that can be used effectively for assessment purposes.
- Recognise the advantages of mobile computing devices for the design of Maths trails and provide effective learning experiences in an authentic context.

Skills:

- Evaluate the importance of adopting a task-centred approach to learning as opposed to a teacher-centred approach
- Differentiate between tasks of low/high level difficulty and low/high level of complexity.
- Differentiate between mathematical tasks according to their levels of cognitive demand.
- Design authentic tasks (including Math Trails) that make mathematics meaningful for the learners.
- Differentiate between different types of rubrics (holistic/analytic, generic/specific).
- Establish a set of criteria aligned with targeted learning outcomes to consistently evaluate students' results and performances.
- Construct productive mathematical tasks by taking into account the learners' different abilities.

Assessment Methods

This module will be assessed through: Assignment, Presentation and Resources

Suggested Readings

Core Reading List:

1. Brookhart, S, M., & Chen, F. (2014). The Quality and Effectiveness of Descriptive Rubrics. *Educational Review*, 67(3).
2. Brookhart, S, M. (2013). *How to Create and Use Rubrics for Formative Assessment and Grading*. ASCD ISBN-13: 978-1416615071
3. Foster, C. (2017) www.mathematicalbeginnings.com
4. McTighe, J. (2013). *Core learning: Assessing what matters most*. Midvale, UT: School Improvement Network.
5. Nyman, R. (2016) What Makes a Mathematical Task Interesting. *Education Research and reviews* 11(16), pp. 1509-1520, DOI: 10.5897/ERR2016.2919
6. Pander, E., & Anders, J. (2013). The Use of Scoring Rubrics for Formative Assessment Purposes Revisited: A Review. *Educational Research Review*, 9, 129-144.
7. Sullivan, P. (2011). *Teaching Mathematics: Using Research-Informed Strategies*. *Australian Education Review*(59). Retrieved from <https://research.acer.edu.au/cgi/viewcontent.cgi?article=1022&context=aer>
8. Sullivan, P., Clarke, D., & Clarke, B. (2013). *Teaching with tasks for effective Mathematics Learning*. Springer.
9. Wake, G.. *Connecting Mathematics with reality:connecting reality with mathematics* University of Manchester.