

Please read Guidance 3xviii in order to complete this form.

New Module Form/Module Narrative

1.	Module code:	DAPP22-01
2.	Title:	Mathematical Understanding and Teaching Methods - Underpinning Theory
3.	Credit points:	30
4.	FHEQ level:	7
5.	Start term:	Autumn, Spring, Summer
6.	Module leader:	Gill Cochrane
7.	Accredited by:	
8.	Module restrictions:	
	(a) Pre-requisite	GCSE Maths Grade C/4 or equivalent
	(b) Programme restrictions	See programme entry criteria.
	(c) Level restrictions	Level 5 or higher.
	(d) Other restrictions or requirements	None
9.	Aims:	To critically examine the research on the acquisition of mathematical understanding, considering both its applications and limitations. To provide the opportunity to critically reflect upon the merits of a range of teaching approaches and resources.
10.	Learning outcomes: <i>(Knowledge and Skills sections can be merged if appropriate)</i>	
	Knowledge and Skills	
	On successful completion of this module, the student will be able to:	
	1. Critically examine the influence of a range of factors on the typical acquisition of numeracy and other types of mathematical skills.	
	2. Critically examine the influence of a range of factors on the atypical acquisition of numeracy and other types of mathematical skills.	
	3. Appraise a range of teaching approaches associated with the development of mathematical understanding.	
	4. Critically evaluate a range of maths resources with reference to the cognitive and affective processes that contribute to mathematical understanding.	
11.	Syllabus:	
	<ul style="list-style-type: none"> ● The characteristics of a good mathematician - the core skills, habits of mind and how these contribute to mathematical competence. ● Typical and atypical development of maths skills - factors affecting development. ● Approaches to teaching maths and conceptualising mathematical understanding (e.g., relational versus instrumental understanding) ● Evaluating maths teaching methods ● Cognitive processes involved in mathematical reasoning/understanding ● Numeracy versus mathematical understanding ● Appraising resources – what makes a resource effective? ● Affective issues in maths learning 	

12	<p>Learning and teaching strategy:</p> <p>Learning and teaching will be via a module on a virtual learning environment (VLE).</p> <p>Module activities include:</p> <ul style="list-style-type: none"> ● Formative exercises such as multiple-choice quizzes with instant feedback, short-answer questions. ● Problem-based learning scenarios. ● Directed reading of selected papers, book chapters, specialist online materials. ● Use of case study examples, videos and other learning materials. <p>The online learning environment supports a collaborative learning environment with:</p> <ul style="list-style-type: none"> ● Fellow students via peer review, presentations by students, group forums and participation in online discussion forums. ● Interaction with tutors including receiving feedback, support (for learning, technical questions and course administration) via private messaging and forums. ● Both students and tutors via forums and webinars (online seminars, live and recorded) by tutors and visiting professionals and academics. 																			
13	<p>Assessment scheme:</p> <p>(a) Formative assessment scheme</p> <ul style="list-style-type: none"> ● Quizzes: comprehensive quizzes covering key content for practice - automatic feedback via VLE. ● Case Study Analysis (Group discussion/forum task) – using learners’ background information to enlighten resource choice with reference to theoretical frameworks, publications etc. ● ‘Ideas for Teaching’ Presentation Task – design and deliver (digital recording) a presentation on a specific topic area (e.g., teaching place value, teaching fractions, teaching shape and space etc.) with reference to cognitive and affective challenges learners can face. ● Essay Plan uploaded for tutor review 																			
	<p>b) Summative assessment scheme</p> <table border="1" data-bbox="277 1507 1474 1955"> <thead> <tr> <th data-bbox="277 1507 762 1581">Task</th> <th data-bbox="762 1507 930 1581">Weighting</th> <th data-bbox="930 1507 1061 1581">Word count</th> <th data-bbox="1061 1507 1236 1581">LO mapped to</th> <th data-bbox="1236 1507 1474 1581">Ethics approval required</th> </tr> </thead> <tbody> <tr> <td data-bbox="277 1581 762 1753">Essay: (For example) - Typical and atypical development of mathematical skills with reference to theories and research</td> <td data-bbox="762 1581 930 1753">60</td> <td data-bbox="930 1581 1061 1753">3000</td> <td data-bbox="1061 1581 1236 1753">1, 2</td> <td data-bbox="1236 1581 1474 1753"><input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="277 1753 762 1955">Presentation: (For example) - Poster, with explanatory notes exploring a range of maths teaching methods and resources with reference to underpinning theory and research:</td> <td data-bbox="762 1753 930 1955">40</td> <td data-bbox="930 1753 1061 1955">2000</td> <td data-bbox="1061 1753 1236 1955">3, 4</td> <td data-bbox="1236 1753 1474 1955"><input type="checkbox"/> No</td> </tr> </tbody> </table>					Task	Weighting	Word count	LO mapped to	Ethics approval required	Essay: (For example) - Typical and atypical development of mathematical skills with reference to theories and research	60	3000	1, 2	<input type="checkbox"/> No	Presentation: (For example) - Poster, with explanatory notes exploring a range of maths teaching methods and resources with reference to underpinning theory and research:	40	2000	3, 4	<input type="checkbox"/> No
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	<ul style="list-style-type: none"> • Critical review of selected maths teaching methods/approaches • Critical evaluation of effectiveness of maths resources in the support of the cognitive and affective challenges learners can encounter 				
Do all assessments need to be passed in order to pass the module Yes					
Seen examination		n/a			
Unseen examination		n/a			
Coursework (no examination)		100%			
14	Timetabled examination required	No			
15	Length of exam	n/a			
16	<p>Learning materials</p> <p>Many of the learning materials have been purpose-written for the module and are available on the learning platform.</p> <p>Most other reading materials that are part of the core materials can be accessed via links to the Dyslexia Action Electronic Library or via EBSCO Host.</p> <p>Essential:</p> <ul style="list-style-type: none"> • Fias, W. & Henik, A. (2021). <i>Learning and Education in Mathematical Cognition</i>. Academic Press • Gilmore, C., Göbel, S. M., & Inglis, M. (2018). <i>An introduction to mathematical cognition</i>. Routledge. • Kersaint, G., Thompson, D.R. and Petkova, M. (2013) <i>Teaching Mathematics to English Language Learners</i>, 2nd edn. New York: Routledge. • Battey, D., & Franke, M. (2015). Integrating professional development on mathematics and equity: Countering deficit views of students of color. <i>Education and Urban Society</i>, 47(4), 433-462. • Chinn, S. (Ed.). (2017). <i>The Routledge international handbook of dyscalculia and mathematical learning difficulties</i>. Routledge. • Mammarella, I. C., Caviola, S., & Dowker, A. (Eds.). (2019). <i>Mathematics anxiety: What is known, and what is still missing</i>. Routledge. <p>Recommended:</p> <ul style="list-style-type: none"> • Chinn, S., & Ashcroft, R. E. (2017). <i>Mathematics for dyslexics and dyscalculics: a teaching handbook</i>. John Wiley & Sons. • Kaufmann, L., Mazzocco, M., Dowker, A., von Aster, M., Göbel, S., Grabner, R., Henik, A., Jordan, N., Karmiloff-Smith, A., Kucian, K., Rubinsten, O., Szucs, D., Shalev, R. and Nuerk, H. (2013) <i>Dyscalculia from a developmental and differential perspective</i>. <i>Frontiers in Psychology</i>, 4. Article 516. 				

Programme(s) using this module (please submit a Programme Change Form and updated Programme specification):

Programme code(s)	Programme title(s)	Core/Optional
n/a		

Validated collaborative partner (if applicable):
n/a

Consultation

The following should be consulted. The checklist below may be used:

University link tutors (if appropriate)	Yes
Students (via Programme Voice Groups and other channels of communication e.g. intranet)	Yes
External Examiner(s)	Yes