Edge Hill University | Faculty of Education

Year 2 BA (Hons) Primary Education with QTS Part Time

ITaP Mentor Manual - Variation in Mathematics

ITaP Mentor Manual - Variation in Mathematics
Year 2 BA (Hons) Primary Education with QTS Part Time

Contents

What is an ITaP?

The focus of this ITaP will be on variation theory within mathematics. Variation focuses on carefully sequenced learning episodes, questions and representations which support pupils to develop a deeper conceptual understanding in mathematics. Consideration is given to what changes and what stays the same to enable pupils to make connections in mathematics. This focus builds on trainees' prior studies of using representations and the CPA approach to support pupils' conceptual understanding.

ITaPs are a blend of centre- and school-based activities to:

- Introduce: support trainees' learning about the theory of teaching and learning around a given aspect of pivotal practice
- Analyse: support trainees to analyse and deconstruct expert teaching
- Prepare: provide opportunities for trainees to use approximations practice and to get multiple opportunities for expert feedback
- Enact: support trainees to apply their learning in the classroom in different scenarios and contexts
- Assess: monitor trainees' knowledge and skills

During the school-based element of the ITaP, trainees will have opportunities to observe and reflect upon expert practice. They will be supported to understand exactly what it is that makes such practice effective and to think about how it could be embedded in their own teaching. Trainees will have the opportunity to apply what they have learned, deconstruct practice, and receive feedback from expert colleagues. The intention is to consolidate trainees' understanding of how the research evidence base underpinning the ITT curriculum should shape their teaching practice. The approach to teacher education will provide trainees with an opportunity to expand their knowledge, deepen their understanding of theory and practice and increase their confidence to teach using a given aspect of pivotal practice.

The role of the mentor during the school-based phase of an ITaP

During Intensive Training and Practice, trainees will be given the opportunity to intensify the focus on these foundational aspects of the ITT curriculum; benefit from immediate and targeted feedback focused on improvement; and access appropriate expert support. As a mentor, you will have responsibility in ensuring that trainees receive the broad range of experiences required during the school-based ITaP days and that purposeful feedback is provided to enable trainees to develop knowledge, skills and confidence.

ITaP - Variation in mathematics

This ITaP has a focus on variation theory. Variation is one of the **'Five Big Ideas'** (NCETM) for effective mathematics teaching. '*Variation influences the way children think about maths by drawing attention to essential structures and relationships within a concept. It is characterised by a carefully constructed small-step journey through learning, where consideration is given to what is kept the same and what changes.*' (NCETM, 2024)

Trainees will be using their knowledge of carefully sequenced, small steps in learning and applying this to ensure pupils have a deep conceptual understanding. An example of this could be to consider the properties of rectangles when exploring quadrilaterals, considering what changes and what stays the same when presented with a range of images. An example related to number could be carefully sequencing questions to embed strategies for multiplying and dividing by 10 and 100. Trainees, in centre-based training, will gain an understanding of presenting the concept in different ways. They will do this through using manipulatives and representations and considering examples and non-examples, as well as sequences of learning.

During school-based training, trainees will have the opportunity to observe and put this approach into practice. Trainees will understand how the teacher represents the concept being taught, often in more than one way, to gain a deeper understanding. Trainees can also see how learning episodes are sequenced, paying attention to what is kept the same and what changes, so connections can be made within mathematics.

On completion of the ITaP, trainees will gain a greater understanding of how variation is successfully implemented within the classroom, to ensure pupils have a deeper understanding of mathematical concepts.

Structure of School-based phase of ITaP

Whilst there are key experiences and components to the school-based phase of the ITaP, schools have autonomy with regards to when these take place. As a starting point, an exemplar timetable on the next page has been provided below to support the mentor in planning these experiences and components. All components within each phase need to be completed by 3rd July 2025.

Pre ITAP training	In Year 1, trainees will have had sessions on the CPA approach and be familiar with this. They will have also completed their introductory professional practice.			
Wednesday 7th May	**WB 19th May**	**WB 2nd and 9th June (depending on school holidays)**	**WB 16th June**	**WB 23rd June & 3rd July***
DAY 1 Centre-based	**DAY 2 School-based**	**DAY 3 School-based**	**DAY 4 School-based**	**DAY 5 School-based/Centre-based**
INTRODUCE/ ANALYSE	**PREPARE/ ENACT**	**ENACT**	**ENACT**	**ASSESS**
Learning about the theory of teaching and learning. Using representations to analyse expert teaching.	Using approximations to practice and get feedback.	Receiving support to apply learning in the classroom.	Receiving support to apply learning in the classroom.	Tracking trainees' growing knowledge and skills.
Seminar (2 hours) Variation seminar – PED2033 Maths tutor	Use of 'walkthrus' to plan for small steps in learning. Observing expert teaching in KS1 – Focus on variation. How variation is used to develop conceptual and/or procedural understanding Expert KS1 teacher	Team teaching – KS1 Opportunities for rehearsal and subject specific feedback.	Observing expert teaching – KS2 – focus on variation. How variation is used to develop conceptual and/or procedural understanding Expert KS2 teacher	Team teaching – KS2 Opportunities for rehearsal and subject specific feedback.
Reading (1 hour) A reading given from one of the key texts.		Reflection with mentor or another expert colleague Discuss outcome of lesson with above colleagues in supporting the understanding of variation in KS1.		Reflection with mentor or another expert colleague Discuss outcome of lesson with above colleagues in supporting the

				understanding of variation in KS2.
Preparation - Questions and areas of focus related to variation in mathematics lessons. Work with peers to devise questions and possible areas of focus. Discuss these with maths tutor in preparation for school.	Co-planning and research Trainees to work alongside the KS1 teacher to plan for the following week.	Reading (1 hour) A reading given from one of the key texts. Discussion with the Lead mentor (EHU)	Co-planning and research Trainees to work alongside the KS2 teacher to plan for the following week.	Reflection and target setting Review of observations gathered in the proforma through discussions with peers and maths tutor. Reflection on the connection of theory and practice and the knowledge and skills gained through the ITAP. Set personal targets for development – action planning. (*Centre-based 3rd July)

Reflections trainees (school-based)

Edge Hill | Faculty of

Observation of variation within mathematics		
	Key Stage 1	Key Stage 2
How was variation evidenced in the teacher's planning of the lesson?		
How were the learning episodes, activities and exercises sequenced to support children in making connections and observing what stays the same and what changes?		
What manipulatives and representations were utilised? Consider how they supported the learning and compare their effectiveness.		
Did you see the use of examples and non-examples? What questions did the teacher ask to develop pupils' understanding of the mathematical structures?		
What did you notice about the sequencing of questions e.g. in independent activities? How did this support a deeper understanding of the concept?		

How did the teacher adapt the representations, questions and explanations of the concept for specific pupils? Please provide specific feedback on any adaptations for pupils with any additional needs or pupils with SEND.		
If an additional adult was available, how did they support the lesson?		

Reflections (Centre-based)

Give an example of when variation was used effectively to impact on pupils' conceptual or procedural understanding.

Give an example of how you used variation in your teaching. What impact did it have? Would you change anything in the future?

Links to ITTECF

High expectations
Learn that…

3. Teacher expectations can affect pupil outcomes; setting goals that challenge and stretch pupils from their starting points is essential.

How Pupils Learn

Learn that…

LT7 - Where prior knowledge is weak, pupils are more likely to develop misconceptions, particularly if new ideas are introduced too quickly.

Learn how to build on pupils' prior knowledge by:

e) Linking what pupils already know to what is being taught (e.g. explaining how new content builds on what is already known).

f) Sequencing lessons so that pupils secure foundational knowledge before encountering more complex content.

Subject and curriculum

Learn that…

LT 3 - Ensuring pupils master foundational concepts and knowledge before moving on is likely to build pupils' confidence and help them succeed.

Learn how to…

Deliver a carefully sequenced and coherent curriculum, by:

LHT (c) - Working with experienced colleagues to accumulate and refine a collection of powerful analogies, illustrations, examples, explanations and demonstrations.

LHT (d) - Using resources and materials aligned with the school curriculum (e.g. textbooks or shared resources designed by expert colleagues that carefully sequence content).

LHT (e) - Being aware of common misconceptions and discussing with expert colleagues how to help pupils master important concepts.

Classroom Practice

Learn that…

2. Effective teachers introduce new material in steps, explicitly linking new ideas to what has been previously studied and learned.

6. Questioning is an essential tool for teachers; questions can be used for many purposes, including to check pupils' prior knowledge, assess understanding and break down problems.

Learn how to…

Stimulate pupil thinking and check for understanding, by planning activities around what you want pupils to think hard about.

Adaptive Teaching

Learn that…

LT2 Pupils are likely to learn at different rates and to require different levels and types of support from teachers to succeed.

Learn how to…
Provide opportunity for all pupils to experience success, by:
(g) Adapting lessons, whilst maintaining high expectations for all, so that all pupils have the opportunity to meet expectations.
(h) Balancing input of new content with the revisiting of prior learning so that pupils master important concepts.
Meet individual needs without creating unnecessary workload, by:
LHT (k) Making use of well-designed resources (e.g. textbooks, manipulatives).
(l) Planning to connect new content with pupils' existing knowledge or providing additional pre-teaching if pupils lack critical knowledge
p) Applying high expectations to all groups, and ensuring all pupils have access to a rich curriculum.

Assessment
Learn how to…
Check prior knowledge and understanding during lessons, by:
g) Prompting pupils to elaborate when responding to questioning to check that a correct answer stems from secure understanding.

Links to Theory and Practice

ASKEW, M. 2011. *Transforming Primary Mathematics*, Routledge.

DAVIDSON, A. 2019. Ingredients for planning student-centred learning in mathematics. *Australian Primary Mathematics Classroom*, 24(3), pp. 8–14. Available at: https://search-ebscohost-com.edgehill.idm.oclc.org/login.aspx?direct=true&db=ehh&AN=138323622&site=ehost-live&scope=site (Accessed: 27 March 2023)

EDUCATION ENDOWMENT FOUNDATION. 2021. Improving mathematics in the Early Years and Key Stage 1. Available from: https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/early-maths

EDUCATION ENDOWMENT FOUNDATION. 2022. Improving mathematics in Key Stage 2 and 3. Available from: https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/maths-ks-2-3

GALLAGHER, M. A., PARSONS, S. A. and VAUGHN, M., 2022. Adaptive teaching in mathematics: a review of the literature. *Educational Review*. 74 (2), pp. 298-320. Available from: https://doi-org.edgehill.idm.oclc.org/10.1080/00131911.2020.1722065.

NEWELL, R., 2023. *Mastery Mathematics for Primary Teachers.* Sage. *London.*

NCETM, 2024. The Five Big Ideas – Variation. Available from: https://www.ncetm.org.uk/features/the-five-big-ideas-variation/

OFSTED, 2023. *Coordinating Mathematical Success: The Mathematics Subject Report.* [Online]. Available from: https://www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report

WATSON, A. and MASON, J. ,2006. Seeing an exercise as a single mathematical object: using variation to structure sense-making. *Mathematical Thinking and Learning*, 8(2), pp. 91–111