

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

**Intensive Training and Practice (ITaP) Trainee Manual:
Variation in Mathematics**



Intensive Training and Practice (ITaP) Trainee Manual: Variation in mathematics

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Introduction: What is an ITaP?

In preparation for the new 2024 Initial Teacher Training (ITT) curriculum, we are running a pilot Intensive Training and Practice model (ITaP) in this academic year. The focus of this ITaP will be on variation theory within mathematics. Variation focuses on carefully sequenced learning episodes, questions and activities which support pupils to develop a deeper 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 your 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 ITaP, you will have opportunities to observe and reflect upon expert practice. You will be supported to understand exactly what it is that makes such practice effective and to think about how it could be embedded in your own teaching. You will have the opportunity to apply what you have learned, deconstruct practice, and receive feedback from expert colleagues. The intention is to consolidate your understanding of how the research evidence base underpinning the ITT curriculum should shape teaching practice. The approach to teacher education will provide you with opportunities to expand your knowledge, deepen your understanding of theory and practice and increase your confidence to teach using the pivotal practice.

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

During the school-based stage of your ITaP, your mentor will have responsibility for ensuring that you receive a broad range of experiences. Purposeful feedback will be provided to develop your knowledge, skills and confidence.

ITaP - Variation in mathematics

This ITaP has a focus on variation theory. You have previously considered the use of the CPA approach within mathematics teaching and how representations and structures can be used to support teaching and learning. Variation is another of the 'Five Big Ideas' (NCETM) for effective mathematics teaching. You will be using 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 an approach to column addition. In centre-based training, you will gain an understanding of presenting the concept in different ways using concrete resources, visual images and considering examples and non-examples, as well as sequences of learning. During school-based training, you will have the opportunity to observe and put this approach into practice.

To exemplify this further the NCETM (2020) suggest the central idea of variation is to 'highlight essential features of a concept or idea through varying the non-essential features.' You will understand how the teacher represents the concept being taught, often in more than one way, to gain a deeper understanding. You will 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, you will have gained a greater understanding of how variation is successfully implemented, within the classroom, to ensure pupils have a deeper understanding of 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 your mentor in planning these experiences and components. All components within each phase need to be completed by 2nd July 2024.

Pre ITP 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 22nd/ Thursday 23rd May	WB 3rd June	WB 10th June	WB 17th June	WB 24th June & 2nd 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	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 above 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. 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. Discuss these with the Lead mentor	Reading (1 hour) A reading given from one of the above key texts.	Co-planning and research Trainees to work alongside the KS2 teacher to plan for the following week. Discuss these with the Lead mentor	Portfolio Overall reflection and target setting (*Centre-based 2 nd July) Discussions with peers and maths tutor.

Links to the Core Content Framework (CCF)

Adaptive Teaching

Learn that:

LT1 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:

LHT 5 Observing how expert colleagues adapt lessons, whilst maintaining high expectations for all, so that all pupils have the opportunity to meet expectations and deconstructing this approach.

LHT6 Discussing and analysing with expert colleagues how to balance input of new content so that pupils master important concepts.

And - following expert input - by taking opportunities to practise, receive feedback and improve at:

LHT9 Making use of well-designed resources (e.g. textbooks). • Planning to connect new content with pupils' existing knowledge or providing additional pre-teaching if pupils lack critical knowledge

LHT11 Building in additional practice or removing unnecessary expositions.

LHT12 Reframing questions to provide greater scaffolding or greater stretch.

How pupils learn

Learn that:

LT6 - Where prior knowledge is weak, pupils are more likely to develop misconceptions, particularly if new ideas are introduced too quickly.

Learn how to:

LHT 10 following expert input - by taking opportunities to practise, receive feedback and improve at: • Balancing exposition, repetition, practice and retrieval of critical knowledge and skills.

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:

following expert input - by taking opportunities to practise, receive feedback and improve at:

LHT4 - Providing opportunity for all pupils to learn and master essential concepts, knowledge, skills and principles of the subject.

LHT5 - Working with expert colleagues to accumulate and refine a collection of powerful analogies, illustrations, examples, explanations and demonstrations.

LHT6 - Using resources and materials aligned with the school curriculum (e.g. textbooks or shared resources designed by expert colleagues that carefully sequence content).

LHT7 - Being aware of common misconceptions and discussing with expert colleagues how to help pupils master important concepts.

Links to theory and research

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-ebshost-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>.

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



School Based Reflection Proforma 1 - 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?		

University Reflection Proforma

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?