St Mary's
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ReflectED

175 Years of Inspiring Excellence

Special Edition: November 2024
Sharing Stories: Practice and Research

Aims and Scope
ReflectED provides a forum for the publication of interdisciplinary articles that celebrate the challenging nature of educational research and practice. It is published by the School of Education to encourage, celebrate and disseminate research, scholarly activity, and exciting pedagogical practice that is in keeping with our mission. This mission is to advance education through continuing reflective practice and professional development in diverse contexts.

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Editorial

This special edition emerged from the School of Education's inaugural Pedagogy conference, *Sharing Stories: Practice and Research,* which was held on St Mary's university campus in June 2024. There were so many rich and exciting pedagogic stories being showcased in the applications for presentations, that the organizing group saw an opportunity to share them beyond the day and capture the stories in a special edition. We hope that you agree that this opportunity was one worth taking.

The articles in this edition cover practice and research with most speaking to both aspects of a researching professional's life. For, what is practice without research and research without practice. Additionally, we have included a specific section on Reflective Practice with papers representing researching professionals across the sectors sharing their journeys of reflecting on aspects of their pedagogy.

<u>The conference</u>
The presentations, and therefore the presenters, at the conference represented all sectors of education from Early Years to doctoral study. Importantly, faculties and schools across St Mary's University engaged with the conference and made contributions from their disciplines. The keynote speaker, Mr Joel Kelly, The Blue School, presented the impact that a project being undertaken at the school has had on the pupils. The focus of the project, social justice in mathematics, demonstrated both the richness of pedagogical approaches to engage young minds in the power of mathematics to influence thinking, but also the cross-phase participation that can develop from opening our classroom doors to all ages of children when engaging in problem-solving activity. The presentation was inspirational and set the scene for the day.

Christine Edwards-Leis, lead of the Pedagogy Research SIG, opens the conference.

Parallel sessions followed with presentations covering a range of topics beyond what has been included in this edition, such as: Abbe Brady, Mel Healy, Sara Daniels and Laura Davies's (St Mary's University: Faculty of Sport, Technology and Health Sciences) work entitled *Academics' reflections on the personal and professional impact of using service learning in undergraduate teaching;* Adam Kohlbeck, Birkbeck Primary School, presented an engaging session where he made the case for instructional coaching; and, Jacintha Moore, and independent education consultant, shared her work and led a discussion on the new framework and curriculum for early years practitioners.

The day provided an opportunity for the educational community to share and engage; an occasion to celebrate the richness of practice in our community and the challenges and tensions that permeate the civic space. We had the chance to listen deeply, consider, and speak and, thereby, contribute to the discourse around pedagogy. We will continue our conversations at the 2025 conference to be held in April at St Mary's University.

Paper generation

All participants at the conference were invited to submit a paper on their work for publication in this edition. Papers were limited to 3,000 words and were double blind reviewed by the team of reviewers in the Pedagogy Research Special Interest Group and by members of the review panel of ReflectED. After receiving feedback, authors were encouraged to respond over the summer with their final drafts. The process of reviewing was a new experience for some of our colleagues and we worked as a team to both develop reviewing competence and confidence but also to discuss the process of providing judgments and useful guidance to emerging authors. The culture of mentoring and guiding new authors and researchers is of great importance to both teams and this edition is evidence of how that philosophy can create long-term artefacts of outstanding practice.

The papers clearly fell into three categories and we present those categories as: Research, Practice and Reflective Practice.

Research

This edition of ReflectED is presented in three sections. First, the section on Research showcases one research paper of the many presented. Jeanette Simpson, an EdD student at St Mary's who is near to completing her doctorate, presented her project *Exploring Home Educated Children's Experiences of Learning.* The project investigates the lived experiences of children who are home schooled thereby offering significant insight into their world of education and the pedagogical approaches they encounter. Jeanette used visual-narrative, participatory methods to collect data from 12 children. Data was collected over a three-week period via photo-journals after which Jeanette interviewed each child to elicit their reflections on the body of material they created. The results from the study are enlightening showing how children are stimulated to learn in a motivational environment.

Practice

Our second section explores the thoughts, actions and behaviours of educators. Our first paper, by Joelle Feudjo Maneze, considers how day-care settings can leverage lived experience to transform pedagogy. Joelle highlights the importance of ongoing professional development and the role that engaging in research plays in enhancing professional confidence. Through her paper, she makes that case that the evidence to transform practice must come through reflection and research within settings.

Our second paper is co-authored by Janine Pavlis and Sam Lovatt. Janine and Sam co-created a module for the BA Primary Education Pathway at St Mary's University which combined their respective specialisms in Design Technology and Computing. In this paper, they reflect on how the module has enhanced subject knowledge and pedagogy in both subjects, and the necessity of ITE providers being responsive to the needs of partnership institutions in order to ensure students are fully prepared for professional practice.

Finally, Helen Thouless and Viki Veale urge educators to consider the characteristics of effective learning. Drawing on their professional practice Helen and Viki highlight that whether we are 4 or 104, we learn through playing and exploring, active engagement and creating and thinking. Their points are illustrated with examples shared by delegates about

their professional practice in schools and higher education settings and an invitation to readers to consider how they can promote transformative learning experiences.

Reflective Practice

Reflective practice as a means of exploring and elucidating professional knowledge is the focus of this section. Taking place in different contexts, the papers draw respectively on arts-based pedagogy, reflective journaling and cross-disciplinary conversations to make explicit issues relating to alternative ways of seeing, academic identity and disciplinary knowledge.

The first paper, by Laura Minogue, is set within the context of the professional development of new lecturers and discusses the integration of arts-based pedagogy on the Postgraduate Certificate in Academic Practice (PGCAP). Here the Course Lead reflects on how integrating photographs, postcards and collaborations with the Drama Department enhances several aspects of the course and facilitates different ways of seeing, knowing and understanding.

Jessica Paul's article traces the journey she has made from Teacher to Teacher Educator and the value of reflective journaling as a tool for understanding and facilitating the required shifts in identity in such a career transition. The article not only draws out some insightful conclusions for how new teacher educators can best be supported but is also of interest in terms of the methods employed. The process of reflective journaling and how this has supported her career transition will be valuable for others undertaking the same journey.

The final paper, by Nic Tierney and Rob Campbell, highlights the importance of cross-disciplinary conversations in enabling deeper epistemic understanding of Mathematics and Science and the value of such dialogues in the wider context of initial teacher education. Two teacher educators reflect deeply on the disciplines they work within as well as surfacing a number of tacit assumptions about each other's disciplines. The reflective nature of this piece is testament to the power of dialogue to generate valuable new understandings and dismantle disciplinary silos.

We hope you enjoy this special edition, which gives a taste of the rich variety of presentations shared at our inaugural pedagogy conference. However, the conference was much more than an opportunity to hear about current research activity or listen to reflections on professional practice. The conference created a space for dialogue and discussion about the relationship between practice and research, and in doing so reconnected us to our pedagogic purpose. We hope you will join us in April 2025 where the conversation will continue!

Christine Edwards-Leis
Laura Minogue
Viki Veale

Research

Paper 1: Exploring Home Educated Children's Experiences of Learning

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Abstract

This study investigates home educated children's lived experiences of learning in order to contribute new knowledge to the growing body of research into home education as an educational practice. The nature of the research is a small-scale, exploratory study using visual-narrative inquiry to ensure a participatory method of data collection that was inclusive to children. Access to the hidden population of home educating families was aided by the researcher's dual positionality as a home educating parent and educational professional. Twelve children aged between five and twelve from six families participated in data collection over a three-week period through a photo-journal method followed by semi-structured interviews to elicit children's reflections on the photo-journal. Thematic analysis was deployed for the interpretation of the data.

Children expressed how they value their engagement in family activity, classes and clubs, through which they experience belonging and competency which contributes to their growing identity. Enjoyability and novelty made learning experiences memorable to children, whilst real-life rather than simulated activity ensured more commitment and motivation. Children associate learning with how far the activity develops their competency or contributes to their development towards an imagined future self. There is a strong connection between several themes found in existing research including learner autonomy and motivation (McDonald & Gray, 2019), incidental learning, real-life experiences (Thomas, 1998) and the benefits of personalisation for learning literacy and numeracy in home education (Pattison, 2014).

Keywords: home education, learning, visual narrative, children, Situated Learning

Research Context

In the United Kingdom there is a well-established culture of home education supported by a diverse network of practitioners, organisations and developing research community (Fenton-Smith, 2017; Kunzman & Gaither, 2020). The political landscape is one of contention between the roles of the parent and the state with regards to children's education and who decides what constitutes a 'suitable and efficient education' *(*Education Act, 1996*)*. As an educational practice, home education is growing with current figures likely to be over 150,000 children which is 1.5% of the school-age population (Department for Education, 2023). This growth has led to various enquiries from educational policy makers and other stakeholders to understand more about the type of education home educated children are receiving (Education Committee, 2021). The committee stressed there were gaps in knowledge and understanding of what children and young people thought about being home educated and whether their education was 'suitable' in being 'appropriate to their age and aptitude' (Long & Danechi, 2023). The Education Committee (2021) acknowledged a space in the current debate for children's voices, concluding that 'children's voices were lacking from research' calling for evidence that included children's views to aid the committee's review of home education.

Research Aims and Objectives

The overall research objective was to uncover home educated children's perspectives on how they learn in order to respond to the deficit of children's perspectives as noted by the 2021 Education Committee conclusions. Capturing children's authentic voices meant ensuring that children participate on their own terms and without having to conform to a preconceived view of learning set by the researcher.

A review of the current literature supported the Education Committee's conclusion that 'children's voices are lacking from research' (HoC, 2022, p.42) but there are a number of revealing studies focusing on parents and observers' perspectives. Three significant themes that emerge from existing literature on how home educated children learn are first, that it is a common experience for home educated children to have autonomy over the learning content and process with their parent taking on the role of facilitator rather than teacher. A second theme is the prevalence and centrality of socio-cultural learning in children's daily lives. A third significant theme was the temporal and transitional nature of practice as children grow and change. With this compelling knowledge base already available, it was important that an additional aim of this study was to compare the findings from the children's perspectives with those from parents and adult observers.

Methodology
Constructing a child-friendly methodology that takes account of power and communication issues inherent with researching children was important in the design. Narrative, in the form of photo-journal storytelling, has its roots in photoelicitation, a well-established, inclusive method that draws its authenticity from the historic place of storytelling in our culture and communication especially in children's cultures (Clark, 2011). The photoelicitation method also allows the child to participate fully, leading and directing the data collection in an inclusive medium where typical barriers to children's voice such as limited language acquisition and power imbalance (Alderson, 1995) is removed.

Photographs have the potential to offer the depth of description a child may not give verbally and so facilitate conversation. Photographs can be symbolic to the child, shedding light on a bigger story in the child's life that is difficult to articulate. The photoelicitation method facilitates the emergence of small stories (Bamberg, 2004) as each photograph tells a story about a learning experience. When the photographs are seen together, their wholeness will create a rich narrative of learning. Together, photographs can also reveal themes, for example a family's educational philosophy might be revealed, which in turn reflects a macro / larger societal narrative, social political issue, or event (Andrews, 2007; Caine et al, 2013).

Storying researcher positionality in narrative research
This research study falls into the category of insider research. The researcher acknowledges that their interest in this study is bound to their own history and experience through their temporal identity as a home educating parent and past experience as a secondary school teacher. They are reminded of what Clandinin et al. (2016) said about narrative researchers; in researching this subject, the researcher cannot extract themselves from the process so they must write themselves into the study.

Researcher's story:
Since January 2022 I have been engaged in insider research with a hidden population of which I am a member. I never imagined I would end up conducting research in the world of home education, but I am very grateful to the families who trusted me and participated in this visual-narrative study.

It was a typical Friday in the autumn of 2021, and we were walking in one of glorious Royal Parks close to where we live with twelve children and one dog. One of the mums, Elizabeth, asked me, 'How's your research going?' to which I answered that it was not going at all as I had struggled to recruit participants after the disruptions of Covid-19 and was considering changing my research focus completely. Elizabeth, always pensive, paused and said, 'you should research us.' She looked up towards the rowdy rush of children all talking at once on the path ahead of us, and added, 'I mean, if it's about learning, well that's what we are all about isn't it.' She motioned her head towards the children. We were home educators. All of our children were aged between five and twelve years old. We met regularly for them to play together whatever the weather, had a weekly Spanish class and regularly arranged educational trips. I looked at Elizabeth with a raised eyebrow; my recent training

on participant consent echoing in my ears and glanced at the other mums who were listening. Helen joined in, 'yeah that would be amazing, I mean, they are learning all of the time, look at them now.' I acknowledged how fascinating it would be to study our children's learning as it was something we were always in dialogue about. I thanked them all for their enthusiasm and openness and said we could talk about again in the near future if they were still interested. And then I deliberately did not mention it again even though I thought about it often. I was determined to act within the bounds of researcher guidelines around consent and did not want to take advantage of my insider status by blurring the lines. If this was going to happen, it would have to come from them.

The researcher 'lives alongside' (Clandinin, 2016) participants as their friends' mum and their mum's friend in the outer circle of their lives, attending birthday parties, engaging in small talk at the local park, attending trips to museums and country parks alongside them. Clandinin et al. (2016) explain that narrative inquirers gain understanding of others' lives by remaining inside instead of outside of stories; by 'attending to each person's knowledge in relational and participatory ways' (Clandinin et al. 2016: p.20). Narrative Inquiry's acknowledgement of the researcher's relational presence makes it an appropriate and enriching method for this study the researcher is conducting as an insider in the home education community.

At first, I imagined an observational study into learning through play; that was something we as mum's always marvelled about as we watched the different age children playing with one another, but I worried about how it would be difficult to achieve authentic consent from the children for such a study. Around the same time, I came across the Strengthening Home Education Report (2021) which had been published that summer. The government had commissioned a committee to review home education and as I read through the findings, it occurred to me what sort of research study our Friday group might be just right for. The report concluded that children's voices were lacking from research.

One Friday in November, when the topic of conversation turned to the Strengthening Home Education Report, I suggested that if we were going to engage in a research study then finding out what our children's own lived experience of learning was would be valuable. The other mums agreed, and I took the idea to my supervisor.

Research Design

The nature of the study is a small-scale and exploratory using visual-narrative inquiry to ensure a participatory method of data collection that was inclusive to children. Data collection was undertaken over a three-week period through a participatory photo-journal method followed by a semi-structured interview to elicit children's reflections on the photo-journal. A semi-structured interview was also used to ask the parent questions that provided context to the child's narrative. The researcher created narrative prose that centred around the photographs using the transcripts from interviews. A final version was signed off by families once they were satisfied that the narratives represented their experience.
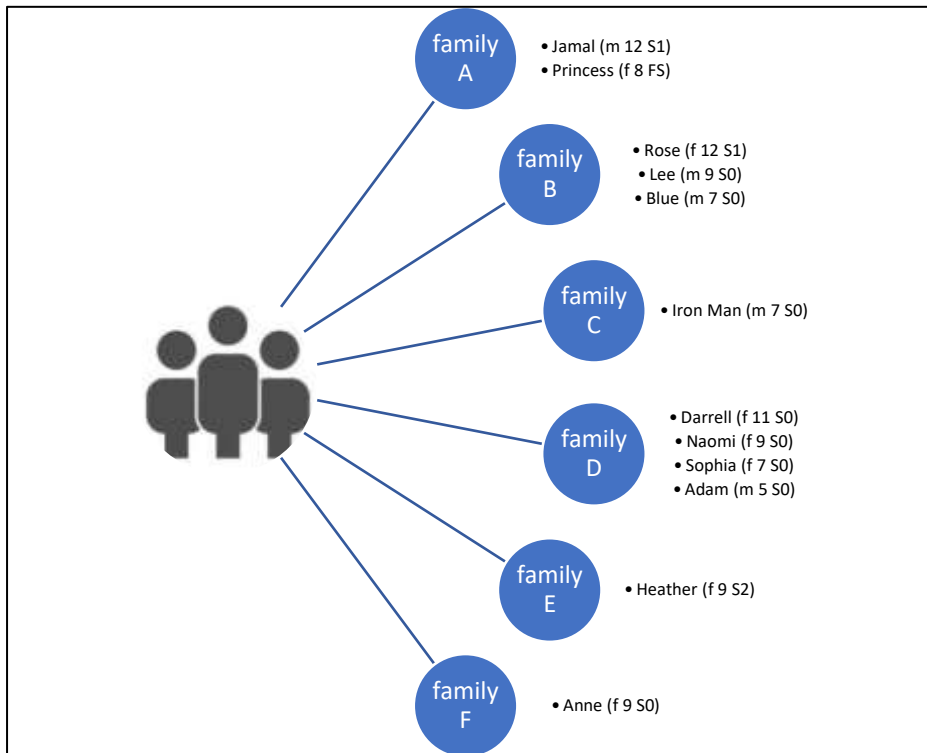
Figure 1: demographic of participants by pseudonym, gender and age and how many years of schooling   they had experienced in the past is shown by S followed by number of years. FS = currently flexischooling)

Findings: Visual Analysis

The following chart shows the results of a survey of the children's descriptions of the images they included in their photo-journal. To preserve the child's language in the survey process, I refrained from interpreting the photographs directly and instead referred to the children's own descriptions in the textual data. I created categories that fitted the children's descriptions.
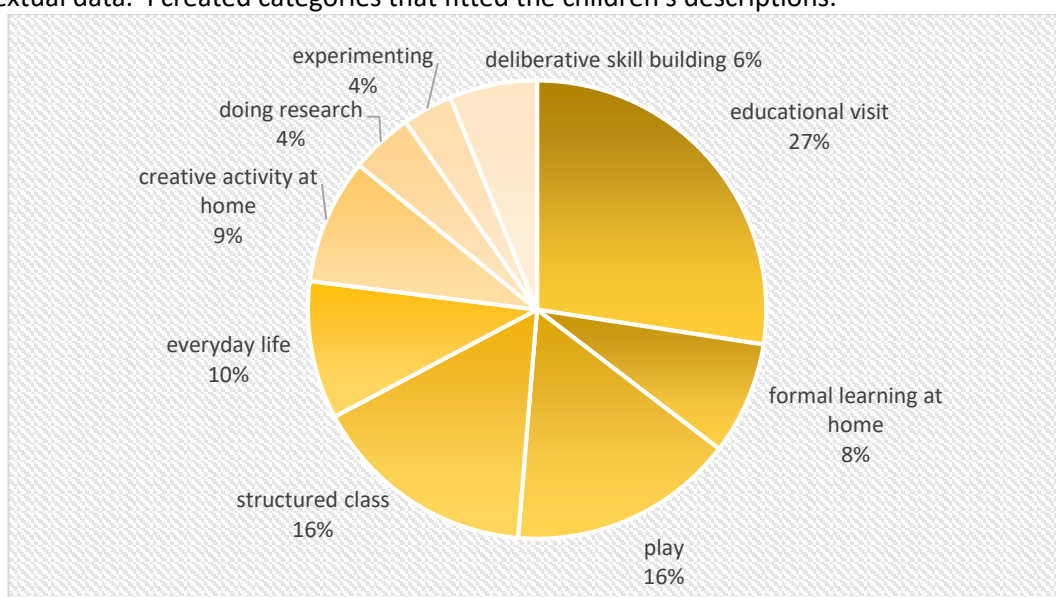
Figure. 2: types of learning incident photographed by children

Children captured incidental learning[1] through everyday life experiences as well as documenting their deliberate learning of skills in a variety of contexts. Attending visits, classes and completing formal learning at home made up 51% of the photographs. This percent illuminates that the children engaged in a typical curriculum based on normative understandings of children's learning for a significant proportion of their time. The survey also reveals the children have a broad concept of learning as 26% of photographs were of play and everyday life. The remaining 23% of photographs were of self-directed exploratory activities such as making, researching and experimenting.

*Figure. 3: 'not all learning is positive'. Lee, aged 9, includes this photograph of injuring his foot whilst playing*

The finding that children had a broad concept of learning is supported by previous research highlighted in the literature review. Children understood learning to be something embedded in daily life rather than a separate endeavour. In response to the research question, the survey of the photographs revealed that the children experienced learning in a variety of contexts; planned activities arranged by parents such as educational visits and structured classes were common and incidental learning through everyday life was recognised by the children as a legitimate and authentic way to learn.

Thematic Analysis of Narratives
Reflexive thematic analysis of the stories behind the photographs and many other connected stories produced themes. The table below shows eight themes generated from a mix of pattern, emotion and focused coding methods (Maurya, 2024; Braun & Clarke, 2021).

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[1] incidental learning is unplanned or unintentional learning

A. developing competency

'learning to be grown up'
Princess, age 8

B. fun and enjoyable activities

I have liked aeroplanes since I was little and visited other times (...) I know facts about them and have three toys of them'
Adam, age 5.

C. real life experiences

'This was a great learning experience for me because it's difficult keeping an animal alive. How do mothers do it?'
Rose, age 12.

D. shared learning experiences

'I learned a lot of things about helping Rose when she got stuck in the river and going back for Rose when she was freezing cold'
Lee, age 9

E. novel and out of the ordinary experiences

'I love how I learned to make something I didn't even know existed'
Anne, age 9

F. family and heritage skills

' That's my Nana. She's the one who bakes the cakes with me! (...) Because Mama and Nana used to be a cake baker for her job and my mum used to work here at Nana's house to bake the cakes'
Iron Man, age 9

G. self-directed learning

'I had this idea because the wooden thing was round so it reminded me of the earth.'
Heather, age 9

H. describing processes and explaining new knowledge

'you can see all my tools here actually; they are ones I use to cut the plasticine up to make the right shape'
Iron Man, age 7

Figure. 4: themes derived from textual data illustrated with an example photograph from the children's photo-journals.

The analysis reveals that the learning incidents children took photographs of were experiences of emotional value, featuring competency development, fun, togetherness and authenticity.   An

illuminating characteristic of all twelve narratives was how children chose to structure their learning stories by describing to the interviewer the process they uncovered or by divulging the new knowledge they had gained. In fact, divulging new knowledge and understanding and the theme of competency were always present together.

Children expressed how they value their engagement in classes and clubs, through which they experience belonging and competency which contributed to their growing identity. Enjoyability and novelty made learning experiences memorable to children, whilst real-life rather than simulated activity ensured more commitment and motivation. Children also associated learning with how far the activity developed their competency or contributeed to their development towards an imagined future self.

Within the findings there is a strong connection between several themes found in the literature review including learner autonomy and motivation, incidental learning and real-life experiences and the benefits of personalisation for learning literacy and numeracy in home education. Accounts of incidental learning of literacy and numeracy connect with the work of Pattison's (2014) work on reading as a cultural practice and evidence of self-directed autonomous learning echoes the findings of McDonald & Gray's (2019) study into unschooling.

Theoretical Reflections

There are clear theoretical connections between the themes of competency development and identity and belonging. Lave and Wenger (1991) used the concept of legitimate peripheral participation as an analytical viewpoint in order to understand learning as a dimension of social practice. This perspective sees the experience of participation as the critical action in the phenomenon of learning. Belonging to a 'community of practice' (Wenger, 1998) as a novice and then, with growing competence, emerging as a master, humans experience their identity socially and temporally. The following extract from Princess exemplifies the connection between competency, identity and participation within a childhood learning context.

> *I think it's really fun posting stuff for mum's work. I like doing it on my own without my mum coming in. I say to her, 'stay here, I am doing it'. I feel like it's fun to do it on my own and also, I don't get embarrassed by her; she embarrasses me everywhere.*
>
> *So I go through the aisles, go to the postman and give it to him. I just put them over the thing and then he does his work and then I collect the receipt which is normally this thick (gestures the thickness of the paper), the receipt, cos mum just makes so much parcels. So, I put this photo in the journal because I am learning. Learning how to act grown up, how to post stuff, how to have my full hands and open a door (laughs).*
>
> *Princess, age 8*

Princess enjoys helping in the family business. She likes the independence it gives her and opportunity to practice acting grown up. The learning activity is an authentic as opposed to simulated one, so it has purpose and meaning. Lave (2011) acknowledged the process of 'upbringing' of children by parents involves the same process of apprenticeship whereby the newcomer (the child) becomes a member of the community of practice through legitimate peripheral participation. Princess is able to contribute and feel belonging and purpose in her learning.

Throughout the narratives there are other examples of the significance of learning in-family skills for children's growing sense of identity and competence which provide compelling evidence for the

relevance of Lave and Wenger's Situated Learning Theory (1991) to home education. In addition, there are other valuable connections between child-led learning, motivation and self-determination theory (Ryan, Deci & Richard, 1985) that are outside of the scope of this report.

Conclusion

This study contributes to the gathering of evidence of how home educated children perceive of their learning experience by producing novel insights into common practices that children recognise as positive in supporting their learning. Analysis around these common practices in relation to theories of informal learning such as Situated Learning Theory (Lave & Wenger, 1991) contribute to the growing multi-disciplinary field of child-led learning. The foremost position of the child's perspective in this study provides rich and detailed visual-narrative data previously unavailable in the field of study. The child-centred method of data collection and accessible output of the visual-narrative form is easily transposed from academic contexts to stakeholders in policy and practice contexts. The potential value of this work lies in its replicability which would yield a much larger dataset for researchers of home education to utilise. The gaps in knowledge and understanding about how home educated children learn that was acknowledged by the Education Committee (2022) can only be filled when more children from this hidden but growing population come forward and tell their stories.

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Paper 2: Leveraging lived experience for transformative pedagogy in daycare settings

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Independent Consultant

Abstract:
This practice paper explores the critical role of evolving pedagogy in day care settings in efforts to build sustainable early learning practices which are tailored to contemporary childhood needs. This paper will do so through highlighting the importance of leveraging Early Childhood practitioners' lived experiences. As a result of exploring the challenges and implications of utilising the lived experiences of practitioners, what is established is the potential role lived experiences have in enhancing professional development, uncovering hidden aspects of practitioner's practices, and adjusting their practices to meet modern childhood needs.

Keywords: Children's cultural capital, early childhood practitioner, lived experience, reflective practice, action research,

Introduction
Through reflective practice and action research, Early Childhood Education and Care (ECEC) practitioners are provided with the framework that serves to examine their own lived experiences, allowing them to in turn fully embrace their roles as researchers. Thus, this reflective practice paper advocates for leveraging ECEC practitioners' lived experiences by fostering transformative pedagogy within daycare settings. It does this through emphasising the importance of enabling practitioners to lead their practice, and to allow their voices to be heard in broader educational discourses while ultimately cultivating children's cultural capital.

Cultivating Children's Cultural Capital
It's crucial to recognise that our actions within daycare settings aim to cultivate children's cultural capital, because it is the essential personal knowledge that children will need to prepare them for future success (Ofsted, 2024). Therefore, because an ECEC practitioner's duty is to provide children with the optimal foundation for their early education, there is an intrinsic requirement for effective learning to also include how an ECEC practitioner will support each child to effectively construct their cultural capital.

One effective approach is treating a child's learning journey as a case study. A "case" involves an in-depth study concentrating on a particular child's learning and development (Mukherji& Albon, 2018). This approach can mean using targeted tools such as Action Research and Reflective Practice with the goal of concentrating on the uniqueness of each child's development. The important key here is as ECEC practitioners are already immersed within the childcare environment, they are already positioned as ethnographers: ethnographic research is conducted in 'naturalistic' settings which makes it particularly suitable for early childhood research (Aubrey et al., 2000). Buchbinder et al (2006) describes naturalistic settings as places where children feel comfortable. This ethnographic approach aligns with the Department of Education advocating that the "depth in early learning is much more important than covering lots of things in a superficial way" (DfE 2023). Thus, there is an opportunity for more tailored educational programs, where ECEC practitioners act as ethnographers.

Navigating cultural transitions: Reflecting on lived experience in daycare settings
My professional journey began over two decades ago when I first encountered ECEC while settling in England. This encounter proved to be an incredibly enriching lived experience as the difference in cultures meant that I was foreign to the robust systems of ECEC in England. What was 'normal' for

those born here, was something I had to actively learn rather than passively understand and apply within my practice. This learning made me naturally inquisitive; and I felt compelled to ask what, why, and how. This curiosity extended not only to practices, but also to the implementation of the Early Years Foundation Stage (EYFS). There followed a period of self-inquiry, during which I reflected on my personal and professional struggles, questioning the why and how of daily practices. As a newly qualified ECEC practitioner, my initial challenge was to comprehend the cultural nuances and professional norms of ECEC in England.

A key example of this was my first experience with an Ofsted inspection early in my career. During the inspection, the inspector observed and complimented my practices, indicating that I was aligning with the Early Years Foundation Stage (EYFS) guidelines. However, when asked to explain the reasons behind my actions, I found it difficult to articulate my rationale. This inability highlighted a gap between my professional training and its practical application. Here, I realised that like many other practitioners, I was acting based on general observations and assumptions, rather than understanding the deeper meaning and purpose behind each individual practice.

Consequently, I embarked on a dual path of professional practice and academic study. During my early days as a qualified ECEC practitioner, my primary concern was to derive meaning and purpose from my daily practice, while comprehending the culture and protocol of practice within the realm of ECEC in England. By successfully integrating academic studies with real-world childcare responsibilities, I was able to scrutinise my daily practices through a critical and reflective lens, thereby allowing me to uncover the subtle nuances of "invisible practice" that can only become apparent through close examination of day-to-day experiences within daycare settings.

The importance of uncovering "Invisible Practices"
Through my personal and professional journey, I can affirm that ECEC practitioners critically reflecting on their personal experiences within daycare settings, is a key to uncovering the subtle nuances of "invisible practices". Argyris and Schon (1974) were interested in the contradictions that could be observed within professional practices, and subsequently viewed these contradictions as inconsistencies that could indicate a noticeable gap between what was assumed to happen within daily practice, and what actually happened. Argyris and Schon's (1974) work shines a light on the reality of daycare settings, where practitioners often adhere to routine customary practices that may not be the most effective or efficient. Recognizing that these habitual practices lead to repetitive patterns that hinder critical reflection is essential for embracing the concept of practitioners acting as researchers to uncover and investigate the often-invisible aspects of practice. This approach helps close the gap between what is assumed to happen, and what is actually happening in daycare settings. To achieve this, practitioners must adopt a mindset of continuous learning and become learners once again.

Reflective practice: ECEC Practitioners Embracing the Role of Learners
Learning and reflection go "hand in hand" and it is difficult to imagine one without the other (Bassot, 2016:15). Johns (1995) interpreted reflective practice as practitioners' ability to assess, make sense of, and learn through work experience, to achieve more desirable, effective and satisfying work. To do so, ECEC practitioners can become learners by using action research as a tool to investigate and reflect on their practices.

Action Research as an Investigation Tool
The primary aim of involving Action Research in daycare setting, is to evaluate the potential of leveraging practitioners' lived experiences in day-to-day practice to enhance the quality of education. Action research involves a 'living inquiry' that explores how real-life experiences underpin investigations (Wicks et al., 2008), making practitioners central to the process (Robson, 2011). This

strategy allows practitioners to understand and reflect on their practice in real-world childcare scenarios. With Action Research, practitioners are engaging in an ongoing process of investigating a child's learning alongside curriculum development and significantly increasing their awareness of their own competencies and abilities. This encourages them to take ownership of their practice and pedagogy, developing it from a perspective of expertise and personal reflection. Therefore, when ECEC practitioners embrace their role as learners, they can reconsider their taken-for-granted values (Ghaye and Ghaye, 1998) and use action research to problematise areas of practice that have previously seemed 'common sense' (Brown and Jones, 2001). This process involves three necessary elements: returning to the experience, attending to feelings, and re-evaluating the experience (Boud et al., 1985).

In the process of re-evaluating their experiences, ECEC practitioners acting as researchers will rigorously examine their practices and deepen their understanding of children's learning processes. This will be exemplified by clear advancements in children's developmental trajectories that significantly enhance their lives. Consequently, ECEC practitioners acting as researcher will not only be empowered to observe, understand, interpret and reflect on their practices, but also to change it.

Morrison (1995) suggests that critical theory aims to transform and empower. Leveraging practitioner's lived experience for transformative pedagogy aligns with Mertens' (2007) argument that a transformative paradigm should be integrated into every stage of the research process, involving an interrogation of power. Thus, empowering ECEC practitioners as researchers will enable them to integrate research elements into their educational technique to critically assess and potentially transform their current early learning provisions into a more suitable and responsive provision with clear and sustainable impact on children.

Action Research as a Participatory Approach
Action research, particularly in its participatory form, is deeply rooted in the tradition of participatory research as illustrated by Freire (1972) and Giroux (1989). In this framework, community organisations lead in establishing and implementing interventions to bring about change, development, and improvement in their lives, acting collectively rather than individually (Cohen et al, 2018). To leverage their lived experience for transformative pedagogy, ECEC practitioners acting as researcher also have to target transformation. It's among others, a journey of personal and professional development, demonstrating how their lived experiences can develop and refine pedagogy within the daycare context. This approach aligns well with participatory research, which involves people and communities directly in the research process rather than conducting research on or for them (Cohen et al., 2018).

ECEC practitioner acting as researcher
In order to understand the rationale behind their actions, ECEC practitioners can combine research and pedagogic practice. Hewitt (2009) posited that each field of public policy is a research arena in its own right, thus, by leveraging practitioners' lived experiences through transformative pedagogy, we can explore how public policies (EYFS) regarding early years education in England, can impact children's learning and development within daycare settings.

This strategy serves as a pathway for providing effective early learning. For example upon superficial observation, the design and execution of educational programs may appear consistent, especially when a practitioner meticulously presents a well-documented children's learning journey. However, it's only upon deeper scrutiny, that gaps and inconsistencies in these programs become evident and by delving beneath the surface, we can discern irregularities in practice, particularly when assessing how practitioners monitor a child's learning progress.

These inconsistencies often times appear because practitioners can encounter difficulties in measuring a child' learning outcomes, due to their heavy reliance on 'the non-statutory guidance for the EYFS 'Development matters'(DfE,2023). As a result, when comparing children's developmental progress, it appears that practitioners are documenting similar learning journeys with only slight variations. This repetition results in generic information being recorded without consideration for the unique developmental paths of individual children. Even the DfE (2023) acknowledges that 'Development Matters' is not a long list of everything a child needs to know and do. It guides, but does not replace, professional judgement. However, the actual learning and developmental trajectories of young children is not so neat and orderly and for that reason accurate and proportionate assessment is vital to help ECEC practitioners to make informed decisions about what a child needs to learn. This misalignment hampers the efficiency and effectiveness of early learning provision, causing the potential for the neglect of the importance of valuing each child's individuality. Indeed, using action research tools, practitioners are able to critically examine inconsistencies emerging as they trace the logical progression of a child's skill acquisition. Thus, ECEC practitioners acting as researcher can seek the integration of this approach into their daily routine through a re-educational transitioning period.

ECEC practitioners transitioning as researcher

ECEC practitioners transitioning as researchers have to reconsider their interaction with children as it involves a multifaceted exploration of such interactions. Pascal and Bertram (2012) highlighted the critical role of ECEC practitioners as researchers, noting that this transition requires a thorough re-evaluation of how they engage with children, and underscores the challenges and implications of this transition, particularly in terms of rethinking and reflecting their interactions with children.

Providing practitioners with the skills and competence to become researchers means practitioners will possess competences enabling them to scrutinise internal 'maps' they are holding in their mind. The goal is to encourage practitioners to critically evaluate and reflect on their actual mental models, thus refining their practical decision-making processes and actions. Argyris and Schon (1974) explains people hold 'maps' in their head: however the internal mental maps that people *actually* use to make practical decisions and take action, are not necessarily the same maps, that they *claim to use* in order to guide their actions. Thus, the suggestion is for practitioners to re-evaluate how the internal mental maps they are actually using to make practical decisions, are actually the same mental maps they are claiming to use in order to guide their actions. To do so, practitioners have to embark on a journey of self-re-education and introspection. This journey will enable them to delve into their professional experiences through research, providing them the opportunity to foster a fresh perspective on ECEC. It will also encourage them to venture beyond their comfort zones, to explore novel avenues that are original, thought provoking, and capable of reshaping the discourse in the present changing world.

As a result of such re-education, ECEC practitioners as researchers have the potential to elevate their profession and make significant contributions to the field of Early Childhood Education. Elevating the role of ECEC practitioners to a professional level is necessary in today's rapidly changing world, where extensive research is conducted on Early Childhood Education, particularly regarding children's experiences in the digital age. For example, Livingstone (2014) explored how digital technologies shape children's learning, while Sutton-Smith (1997) examined the evolving nature of play and its impact on children's development. Given their close relationships with children in naturalistic settings, ECEC practitioners could actively engage in researching such topics. This kind of practitioner-led research, as emphasised by Miller and Cameron (2013), is vital for enhancing professional development and improving the quality of Early Childhood Education.

Reinventing continuous professional development

Reinventing continuous professional development is important for maintaining effectiveness and ensuring ongoing skill enhancement by serving as a catalyst for sector-wide improvement. It is imperative to not move away from traditional approaches of professional development without first evaluating their effectiveness for ECEC practitioners. For example, the provision of high-quality CPD facilitated by the Department for Education (DfE) through the development of an online training resource portal named 'EY upskill' represents a positive advancement. However, its effectiveness in addressing sector needs remains uncertain, and its adoption has been limited (Sajr and Bonetti 2023). One potential explanation could be that this CPD approach may not sufficiently empower ECEC practitioners, and the knowledge acquired from these trainings may not always align with the needs and perspectives in their real-world childcare setting. Therefore, before exploring potential solutions of CPD, it is essential to invest time in thoroughly understanding the challenges associated with continuous professional development.

Empowering Practitioners to lead their learning
Spillane and Clarkin-Phillips (2009) advocate for a distributed leadership approach to professional development: enabling practitioners to lead their own learning and providing space to engage in discourse that could significantly improve provision. Distributed leadership will bring about the formation of discourses which in turn allows for ECEC practitioners to influence and contribute authentically to the growing discourses surrounding Early Childhood Education. Distributed leadership can serve as a key driver in building a new model that promotes discourses that go on to generate not just a practitioner's reflection of their practices, but also a powerful tool for developing new pedagogical approaches.

Foucault (1972) examined discourse as a system of representation, focusing on the rules and practices that create meaningful statements and shape knowledge. Drawing from Foucault's perspective, ECEC practitioners who embrace their roles as researchers can generate insights that reflect their understanding of early learning, thereby playing an important role in reshaping the discourse surrounding Early Childhood Education. Similarly, Smith's (1998) viewed discourse as a product of how individuals generate meaning through activities like talking and writing within specific contexts.

The formation of discourse around early learning in naturalistic settings, such as daycare, offers a valuable pathway for ECEC practitioners to develop structured knowledge. Inspired by Smith's (1998) perspective, ECEC practitioners can cultivate structured knowledge through activities such as talking, writing, and reflecting, supported by action research and reflective practice within naturalistic environments. This process not only empowers ECEC practitioners, but also fosters the development of transformative pedagogies.

Empowering ECEC practitioners to lead their own practice-based research enables them to create and engage with discourses that emerge from their lived experiences. These reflections, when well-structured, can give rise to discourses that inform and inspire contemporary ideas in early learning. Because these practitioners develop these ideas in collaboration with children in naturalistic environments, the resulting knowledge is likely to be more accurate and relevant than that generated by individuals removed from practical, everyday experiences with children.

This practice-based research approach fosters a deeper professional understanding, transforming practitioners from mere technicians into reflective professionals capable of influencing and shaping the field. By embracing their role as researchers and drawing on their lived experiences, ECEC practitioners not only enhance their professional development but also become better equipped to cultivate children's cultural capital, ensuring that professional development is continuous and grounded in real-world practice.

Conclusion

Empowering practitioners to lead their own professional development through action research and reflective practice encourages the generation of new, transformative pedagogic knowledge. By deeply engaging with their lived experiences, practitioners become researchers who critically evaluate and innovate daily practice within their settings. This dual role enables them to conduct "living enquiries" and continuously reflect on improving their practices. Ultimately, they can better understand and support each child's unique developmental path, moving beyond generic documentation to more individualised and meaningful learning journeys.

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Paper 3: Exploring the connection between Design and Technology and Computing: Enhancing Learning Opportunities in Primary Education

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Abstract:
This practice paper examines the intersection of Design and Technology (D&T) and Computing within the Bachelor of Arts (BA) Primary Education programme at St Mary's University, highlighting the introduction of a combined elective module for undergraduate Year Three students. This article has been written to summarise the new module and help support teachers of D&T and Computing in Initial Teacher Education (ITE). It reflects on the historical devaluation of D&T in England's National Curriculum and its ongoing identity crisis. The uncertain future of D&T is contrasted with the evolving pedagogical approaches and international perspectives on technology in education, particularly within STEM fields. The authors advocate for enhancing subject knowledge and teaching quality in both D&T and Computing, exploring pedagogical practices to enrich trainee teachers' understanding of these subjects. The alignment of D&T and Computing in the National Curriculum supports broader STEM objectives, emphasising the importance of encouraging problem-solving through real-world applications. Design in D&T education is increasingly influenced by computational thinking, providing an ideal opportunity for meaningful integration of both subjects. The paper closes with reflections from the authors and other stake holders in the module concluding that its success is a starting point for further reflections in this area.

Keywords: Design and Technology, Computing, primary school teaching, pedagogy, problem-solving behaviours

The Rationale

This practice paper contextualises the different pedagogical approaches to two National Curriculum subjects taught within the BA Primary Education (with Qualified Teacher Status) programme at St Mary's University. By reviewing the literature related to Design and Technology (D&T) and Computing, we explore and reflect on a new module. Our rationale and context for the new module lie in interdisciplinary integration, aimed at enhancing student engagement within D&T and Computing. This approach bridges the gap between these subject skills, with the aim of better preparing students for their careers in teaching. This module marked the introduction of the first ever combined elective module for our Year Three undergraduate students.

Design and Technology and Computing

Over the years, D&T education in England has experienced a loss of value and purpose, prompting significant discourse regarding its aims and objectives (Hardy, 2018; Bell, 2017). A pivotal moment in political history occurred when the inclusion of D&T in the National Curriculum was debated (Department for Education, 2011). The panel questioned whether D&T possessed sufficient disciplinary knowledge to remain a curriculum subject (Atkinson, 2017). Subsequently, there was fear that the subject might lose its identity entirely, a concern that persists today as ongoing discourse continues to question its existence and rethink its future (Spendlove, 2023). Despite navigating four educational reforms and debates about its name on a semantic level, some core values established since the 1988 Education Reform Act have persisted and make up the National Curriculum (DfE, 2013) that English school systems use today.

The future of D&T as a subject in the curriculum is uncertain. However, reflecting on current teacher training, government policy and relevant literature provides some insight. There is a particular interest in the international perspective on 'technology' in education, especially within STEM (science, technology, engineering and maths). The evolving context of D&T has prompted us to further explore the National Curriculum objectives to enhance subject knowledge in both D&T and Computing, ultimately aiming to improve teaching quality (Barber and Mourshed, 2017).

Similar turbulence to subject identity has also been seen in Computing. This introduction of the 2013 National Curriculum saw the shift of ICT (Information and Communication Technology) to Computing. Advisors from technology companies stated that the old ICT curriculum did not allow children to develop the skills of innovations, creativity or computer science (Livingstone and Hope, 2011). The shift to Computing saw the addition of computer science at primary level. This addition had an assumed knowledge in the teaching community, when in reality it left teachers with insufficient subject knowledge (Larke, 2019). Consequently, this led to the teachers being gatekeepers to the curriculum and only teaching what they were confident with, which in most cases were the old ICT elements (The Royal Society, 2017; Larke, 2019). Current students on BA Primary Education (with Qualified Teacher Status) programme are likely to have been taught by teachers who were gatekeeping the computer science elements of the curriculum. Therefore, our ensuring the students on the programme understand computer science, its applications to real world circumstances and how to effectively teach it, is vital.

With an aim to improve teaching quality, underpinned by pedagogical practices and adhering to the values we are passionate about, we began to explore ways to enlighten our trainee teachers' thinking around D&T and Computing.

Moving Forward: How do Computing and Design and Technology intersect?
The primary National Curriculum in England for D&T states the importance of children drawing on a broad range of subjects such as Computing and Engineering (DfE, 2013). Within the Computing National Curriculum, it explicitly reinforces the subject's links with D&T (DfE, 2013). The alignment of these two subjects affirms the significance of broader STEM goals, with D&T and Computing highlighting maths and science in the curriculum. STEM education has evolved into a pedagogical approach where pupils solve real-world problems by presenting academic concepts in 'realistic and meaningful situations' (Kalogiannakis and Ampartzaki, 2022, p. 3). Previous objectives in the field of D&T education indicate that 'design' is driven by computational nature of thinking (Blom, 2023) and the ability to find solutions to people's needs (Visser, 2009). Therefore, the links between D&T and STEM remain strong. Before planning this module, we recognised the importance of establishing a strong foundation in STEM-based cognitive activity, as this provides necessary skills for children. By ensuring this solid foundation, we allow D&T and Computing to flourish as integrated subjects.

The D&T and Computing curricula (DfE, 2013) encourage STEM-based cognitive activities and go as far as suggesting 'purposeful design' in Computing and 'control technology' in the study of D&T. However, through closer examination, the connections between our subjects are at a deeper level; there are connections between the pedagogy and desired skills we want students to understand and gain. Computational thinking is a set of skills and approaches to learning that equip pupils with a framework for solving problems (Wing, 2006). Skills such as algorithmic thinking, abstraction and debugging are promoted through computational thinking, which we use with our trainee teachers. Despite the term *computational* thinking, it is widely argued that the skills promoted can be applied away from technology and computers (Morris et.al., 2017). The approaches and concepts outlined by Barefoot Computing (n.d.) link to D&T and the iterative design process, highlighted as an illustrative model by the Design and Technology Association (DATA, n.d.). This pedagogical design model has evolved over time; however, it continues to hold significance within primary education, as teachers

play a crucial role in helping to develop children's iterative processes, which are further built upon in Key Stage Three (KS3). One approach that best encapsulates this link between the two subjects is 'tinkering'. Tinkering, as it is termed in Computing education, is the process of exploring and testing opportunities, before final design choices are made (Resnick, 2017). The iterative nature of tinkering promotes the desired skills of the iterative design process.

Facilitating projects within learning allows children to see the process of creating from an initial idea to the finished product (Resnick, 2017). Resnick (2017) outlines how structuring a project can allow children to apply computational thinking skills to real-world and practical contexts (The Royal Academy of Engineering, 2014), which is similar to the iterative design process as outlined by DATA (no date). These connections and shared skills (as seen in Figure 1 below) are elements that we celebrate and highlight within the projects we showcase within the new module.
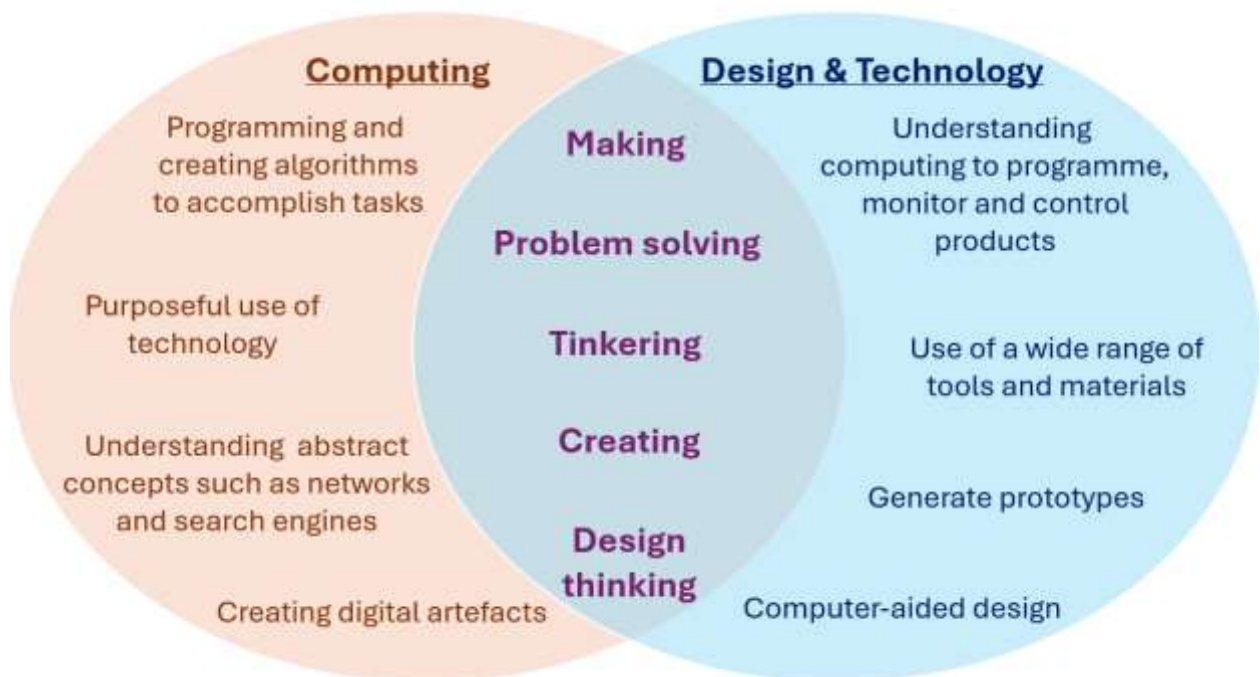

Figure 1: Shared Skills

Learning Opportunities for our Trainee Teachers
In our module, we aim to provide trainee teachers with opportunities to enhance their subject knowledge while also experiencing effective pedagogy and understanding the connections between subjects. To enable this, we decided to explore two projects throughout the ten weeks: designing and making a car using small programmable devices, such as Crumble boards, and a textile project designed using Computer Aided Design (CAD). The facilitation of the trainee teachers to complete the projects, meant they were exposed to computational thinking and the iterative design process as a learner and could reflect on the connections and skills explored above. They decomposed, tinkered, created and debugged in an iterative nature as they created, whilst we modelled the desired pedagogy that would allow children to be brave, tinker and create within the primary classroom. With frequent reflections, the pedological choices we made as lecturers were explained to our trainee teachers. In this way, we are highlighting how iteration and tinkering can be utilised and supported when teaching Computing and D&T, and lessons where the subjects meaningfully combine.

Alongside the projects we visited the Design Museum to reflect on the opportunities a trip like this may present primary aged pupils. We also invited subject leaders for D&T and Computing from two

local partnership schools, to share their experiences of leading in these subjects. Finally, our trainee teachers had the chance to apply their newly acquired skills and experiences in a partnership school. Working in groups, they designed a one-hour lesson for Year Six children with the specific aim of creating a prototype steady-hand machine using a micro:bit to develop the game. Providing children with these links allowed them to understand the importance of the subjects working together within a design process.

An important aspect of the trainee teachers' lessons involved planning for deliberate errors in the steady-hand machine design, challenges that the children had to address. For instance, once the children had set up the game on the micro:bit, they had to figure out how to clear the micro:bit screen to restart the game. This underscored the collaborative and resilient nature of the lesson, with our trainee teachers encouraging the children to persevere and tinker, as part of a trial-and-error approach. This allowed our trainee teachers to model the pedagogy they had seen during taught sessions at university.

Reflections on the Combined Module

To evaluate our practice and ensure that our module made an impact on the trainee teachers' experience and recognition of the two subjects, we sought to gather feedback from stakeholders as well as formalise our personal reflections. To support this process, elements of Gibb's (1993) reflective cycle were applied, allowing us to systematically reflect on the experiences of the module and use the analysis to identify improvements.

We believe that the module was pitched appropriately and effective in purposefully integrating the subjects in a meaningful way (Kalogiannakis and Ampartzaki, 2022) that allowed our students to develop confidence in teaching subjects in which experienced teachers are not confident in teaching (DfE, 2023). Trainee teacher engagement in the module was high, and the work they created during the projects was at an exceptionally high level, as commented by subject leaders from local schools. It was pleasing to see them show resilience when applying programming skills previously learned in earlier modules to the new Crumble environment. The children in the school were enthusiastic, excited and engaged throughout the teaching. Teachers from the school were pleased with the lessons and praised our trainee teachers' professional approach to teaching, which highlighted the need for further professional development within the school.

To further support our personal reflections, we gathered feedback from our trainee teachers and the teachers from the school-based elements of the module. Feedback from the trainee teachers was anonymous and via the university's end-of-year reflections. The responses we received enabled us to gain deeper insights for refining our approach in the upcoming academic year. Three core themes emerged from the feedback: skill development, where a hands-on approach to learning was effectively integrated into the module; practical applications of the projects, where real-world problems made the learning process more engaging and provided concrete examples; and confidence in teaching the subject, which influenced their ability to inspire and engage children.

Trainee teacher feedback supported our personal reflections that we had an effective balance of theory and practical. One trainee teacher reported that '*the practical work was great',* but the discussions beforehand helped with '*the understanding of what we are doing and why we are doing it'*. It was rewarding to see that this translated into our trainee teachers' teaching with children. The teacher from the school commented that our trainee teachers' teaching supported her pupils to '*explore new technology and acquire valuable skills'*.

Both our trainee teachers and the teachers explained that the projects explored in the sessions provided them with ideas to support their teaching in schools. One trainee teacher suggested that

the learning in the module facilitated their ability to explore *'meaningful and purposeful'* projects for children. After attending our trainee teachers' exhibition, which was an assessment point where they showcased their learning from the module, a teacher commented that they were excited to '*incorporate some of their ideas into projects*' they were teaching.

Finally, our trainee teachers also mentioned that engaging with the module helped develop their confidence in how the two subjects can meaningfully combine to bring value and purpose to both. One trainee teacher reported that the module '*integrated two 'scary' subjects in a meaningful and innovative way*'. This *meaningful integration* was further supported by another student who discussed that they now felt '*very confident*' in delivering projects in schools. It was pleasing that the trainee teachers felt more confident in teaching the subjects due to engaging with the module.

Conclusion: What Next?

Reflections from trainee teachers, experienced teachers and from our personal perspective support the successful delivery of this new module. To revisit our main objectives, informed by the subject's political history, current literature and our future values driven by our passion for D&T and Computing, we aim for the module to continue evolving. Although the future of both subjects remains unknown, the incorporation of STEM-based cognitive activities, plus the link between both subject's design thinking, has meant that our trainee teachers feel confident to explore and refine their pedagogical approaches to teaching the two subjects (Kalogiannakis and Ampartzaki, 2022). We recognise that the areas of the National Curriculum highlighted in this paper can be challenging to teach; however, we want to alleviate these challenges by prioritising the development of these skills. We seek to continually engage our students and local schools, exploring the positives of meaningfully bringing together D&T and Computing. As an ITT institution, we respond to the needs presented by our partnership schools and aim to prepare our students to be the best teachers they can be.

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Paper 4: From 4 to 104: The characteristics of effective learning

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Abstract:
In England, the pedagogic practice of those who work with children from birth to five is guided by the statutory framework for the Early Years Foundation Stage (Department for Education (DfE), 2024a), which sets out the characteristics of effective teaching and learning for children aged 0-5: active engagement; creative and critical thinking; and playing and exploring. In this article, we explore how these characteristics can guide effective practice and transformative learning regardless of the phase of education. Drawing on our research and lived experiences as educators working with young children through to adults in higher education, and feedback from colleagues who attended our session at St Mary's 2024 Sharing Stories: Pedagogy and Research conference, we explore where the characteristics of effective learning can be found throughout the educational journey and how taking this lens can lead to a transformative experience for all learners.

Keywords: Early Years; Higher Education; playing and exploring; active engagement; creating and thinking critically

Our professional context

The authors of this article began their teaching careers in the 1990's. We have worked in a variety of settings including homebased childcare, nurseries, primary schools, secondary schools, alternative provisions and special educational need and disabilities (SEND) settings in England and overseas, and are now based in higher education. Although we now work with adult learners, we retain the lessons we learned while working with young children under the age of five, in what is known in England as the Early Years Foundation Stage (EYFS). The period from birth to five is a time of rapid growth, critical learning and development (Sylva, Melhuish, Sammons, Siraj-Blatchford, and Taggart 2004; Tickell, 2011; Nutbrown, 2012; DfE, 2017). However, throughout our careers we have been confronted with the challenge that, while many profess to value the work that takes place in EYFS, few really understand Early Years pedagogy. Indeed, there is a perception that our practice is viewed as less rigorous than that of our colleagues in other phases (Veale, 2023). It seems that although those who lead learning in Reception Classes in England share the same qualifications as those who work with older children (DfE, 2024b), a false distinction exists between the value attributed to pedagogic practice in different Key Stages.

International comparisons of educational outcomes at the end of secondary schooling have led to high stakes testing and downwards pressure to formalise learning in order to produce comparative data (McDowall-Clark, 2017). The neoliberal drive to standardise education practice has led to the introduction of the Initial Teacher Training Core Content framework (DfE, 2021). Largely informed by research conducted with older learners (as explored by Veale, 2023), this framework promotes adult-centred, didactic strategies which are pedagogically inappropriate for younger learners. Although these strategies serve the dual purpose of supporting some students to accrue knowledge and enabling policy makers to measure that directed content has been taught, there is an important difference between teaching and learning that bears further examination.

In crude terms, teaching can be described as the transmission of specific knowledge or skills from one person to another. By contrast, learning involves a lasting change in thinking or understanding (Bruner, 1957). Rather than a one-way exchange between teacher and pupil, learning is a transformative act which involves critical reflection (Mezirow, 2003) within a community of practice where knowledge is constructed and negotiated (Wenger, 1998).

In each of the settings we have worked in, we have aimed to create democratic learning spaces where students from 4 to 104 (we admit that neither of us has yet worked with a student who has reached this grand age, but we have worked with adults in their seventies) can co-construct knowledge and understanding. For this to happen, we follow the principles that underpin practice in the EYFS (DfE, 2024a): we get to know our students as unique individuals, build positive relationships with them and provide an environment in which they feel safe to take risks and engage in critical reflection, regardless of the age of our students. In doing so, our aim has been for our learners to develop a positive image of their own abilities, to stimulate their intellectual curiosity and to foster a love of learning. In doing so, we constantly return to the three characteristics of effective learning: active engagement; creative and critical thinking; and playing and exploring.

The characteristics of effective learning
The origins of the characteristics of effective learning can be traced back to the Tickell review (2011), which noted the need to think about not just what children learn but how they learn and what motivates their learning (Evangelou, Sylva and Kyriacou, 2009). They were introduced in the 2012 revision of the statutory guidance and warmly welcomed by the sector. While subsequent revisions of these guidelines have continued to include them, as Dubiel (2024) points out, the influence of the knowledge-based curriculum introduced for older learners has resulted in a decline in the emphasis they are given.

Our argument is that these characteristics are part of effective learning at any age. To help us think about this, at St Mary's 2024 '*Sharing Stories: Practice and Research' c*onference we asked fifteen colleagues who work in higher education, and three who work in other educational sectors, in what ways they use the characteristics of effective learning in their professional practice. Their responses provided further food for thought about pedagogy in higher education and how these characteristics are present in learning 'from 4-104'.

Active engagement
Active engagement is a concept which encompasses not only engagement but also motivation. Initial motivation comes when interest in an activity is aroused. This interest may be triggered by novelty, curiosity or the learner's need for consistency (Laevers, 2020). In other words, when our interest is piqued, the activity becomes meaningful and motivating. For effective learning to take place, it is not enough for an activity to merely pique our interest: interest must also be sustained. Stewart (2011) points out 'the most satisfying and motivating activities always involve a degree of challenge' (p. 52). Effective learning is not always easy but instead requires us to be motivated to persist and keep trying until we reach our goal. While we have an innate drive for competence, autonomy and relatedness (Ryan and Deci, 2020), Beswick (2017) explains that highly curious people have a willingness to accept the limits of their knowledge and a desire to learn something new which enables them to remain actively engaged in situations where there is a degree of uncertainty.

The ability to sustain engagement enables deep learning to take place. This concept is supported by Laevers' (2000) work on motivation and is described by Csikszentmihayi (2000) as a state of 'flow'. In the state of flow, the learner becomes totally absorbed, focused, engaged, in control of their learning and enjoying the activity for its own sake rather than for any perceived reward. A key factor in ensuring the active engagement necessary for deep learning to take place is choice. Skilled teachers are able to provide not only a choice of what to do but also how to do it, giving learners the autonomy necessary to experience the sense of competence and joy (Kingston-Hughes, 2024), which reinforces the drive to learn more.

Several of our respondents from higher education discussed the importance of active learning and having students explore ideas in practical sessions. For example, one undergraduate lecturer wrote,

I use the iterative design process to help the students design and make through a trial-and-error practical process. This is often a whole hour of maintaining concentration on new skills being developed.

In this case the students are deeply involved in the design process and keep trying with sustained concentration over a significant time period. While Beswick (2017) may not have been referring to university students, this example highlights the importance not only of willingness to engage with situations where there is a degree of uncertainty, but also to sustain engagement so that deep learning can take place (Laevers, 2000). Our colleague's example illustrates that, even at the higher education level students need to engage in active learning and be given the time to make sense of and develop their learning.

Creativity and critical thinking
Creativity and critical thinking have been identified as crucial in all areas of human activity (NACCCE, 1999) and described as key 21st century skills (Vincent-Lancrin et al, 2019). Critical thinking can be defined as the conscious self-regulated decision-making process that sustains progress towards a specific goal (Bronson, 2000). This metacognitive process enables learners to draw on prior experience to make connections with what they already know in order to decide how to proceed. It involves being able to make predictions and find novel ways to solve problems. Critical thought is supported through sustained shared thinking where learners are encouraged to articulate their ideas to others, making the thinking visible (Brodie, 2014). Skilled pedagogues will use careful questioning to draw out ideas and support metacognition and may develop or extend learning through planning linked experiences.

Despite critical thinking being a key 21st century skill (Vincent-Lancrin et al., 2019) only one higher education lecturer actually used the word "critical thinking" in their response,

Teaching placements and experiences where we let students take responsibility for planning and delivering lessons and allow them to make mistakes and learn from them as opposed to trying to micromanaging these. This of course only works when students are supported to engage in critical reflection during this process.

Criticality is one of the things that St Mary's lecturers explicitly mark students on, being a part of the assessment criteria from at least Level 4. The marking guidelines state that for students to achieve a 2:1 they must show "good analytical ability" (Assessment Policy Review Working Group, 2016, p. 3) and to get a 1st they must demonstrate "critical engagement" (p. 4) with reading. Critical thinking is so embedded in our programmes that it is probable that these university lecturers value and teach critical thinking even if they did not use the words.

Three of the lecturers did discuss the importance of collaboration and discussion, and it is possible (although not guaranteed) that students engage in and develop their critical thinking through these discussions. This would align with Brodie's (2014) observations about the importance of making one's thinking visible to others and engaging in sustained shared thinking. Stewart (2011) suggests that the process of sustained shared thinking also fosters creativity as it encourages students to explore different perspectives and generate new ideas. The ability to think divergently and creatively enables the learner to suspend judgement and explore a range of possibilities, focusing on the process of learning rather than a specific product. Amabile (1999) insists that freedom, security and challenge are all essential in fostering creativity, cautioning that without these elements, we tend to simply replicate what is familiar, tried and tested.

Only one lecturer explicitly mentioned creativity. Again, this surprised us, as creativity is also part of our university assessment criteria. Indeed, in order for a St Mary's student to get a 2:1 or above for their dissertation, our guidelines state that they must show "originality of thought" (University Assessment Criteria, 2019, p. 60). As creativity has been identified as crucial in all areas of human life (NACCCE, 1997), it seems that Higher Education lecturers would do well to value creativity and playing more, so that we encourage the original thinkers needed in the workforce (Vincent-Lancrin et al., 2019) to graduate from our universities.

Playing and Exploring
It is widely recognised that children use their senses to explore the world around them from birth, it is this exploration and play that allows children to learn and develop. However, play is an elusive concept (Stewart, 2011), which even those working with young children find it challenging to define (Adams, Alexander, Drummond and Moyles, 2004; Wood and Bennett, 1997). Bruner, Jolly and Sylva (2017) explain the concept of play well, describing it as an approach to action, rather than a specific activity. We agree that play is a mindset rather than an activity and that playful approaches may include open ended exploration, cooperative or collaborative activities, and any number of experiences which build neural connections and encourage flexible thinking.

From a scientific perspective, Einstein (1936, np) himself expressed the importance of play describing it as 'the highest form of research' and science itself as 'nothing more than the refinement of everyday thinking'. Like scientists, young children are constantly building theories about how the world works and refining these through exploration and experimentation (Stewart, 2011).   Through play, we not only develop our understanding of the world around us, but also our resilience, confidence and ability to think flexibly and apply our learning when faced with complex problems (Bandura, 1994). As the cerebral cortex develops, play becomes increasingly complex and children are increasingly able to control their impulses, maintain attention and draw on their prior knowledge to find new ways of doing things. The role of adults and other educators in supporting this playful learning involves managing the fine balance between interacting to develop and extend thinking, or interfering and destroying the learners' sense of autonomy and enjoyment (Fisher, 2016). The skill of educators in supporting playful learning should not be underestimated but, as Paley (2004) observed, the miraculous is often confused with the mundane and the skills involved in supporting play and exploration are all too easily overlooked.

Only one undergraduate lecturer participating in our conference session explicitly mentioned playing and exploring,
> It underpins my HE [Higher Education] teaching pedagogy, i.e. using playful approaches to exploring academia which brings about creativity and critical thinking.

However, we would argue that the active learning discussed earlier requires a stage of playing and exploring and that it is through active play-based approaches the deeper understanding and greater sense of ownership over learning associated with graduate level study are best achieved. Although Bruner, Jolly and Sylva (2017) describe play as an approach to action rather than a specific activity, maybe as academics we are not comfortable with the idea of frivolity that is implied by using the word "play", an attitude that seems strange as Einstein (1936) himself described play as the highest form of research. It may just be that the colleague who made this observation is more comfortable with using the same terminology as we use than the others attending the session. This returns us to our original point that there is an issue with the way the pedagogy and associated terminology of the EYFS are perceived.

Reflecting on the characteristics of effective learning in Higher Education

Two of our respondents reflected on their limited use of the characteristics of effective learning in their own teaching. One course lead lamented that they had "fallen into the HE trap". This comment implies a sense that there are ways of being in universities that may not align with our natural thoughts about how to lead learning and that these ways of being do not always encourage teaching that produces the most effective learning outcomes. What also struck us was that, in response to our invitation to consider how they used the characteristics of effective learning in their practice, a primary teacher also exclaimed, "Not enough if I'm honest! We are so pressured to get through the curriculum!" This response is an acknowledgement that effective learning takes time, but curricular and pedagogic pressures do not always allow for this exploration and there is a need to reconnect with pedagogy as leading learning rather than the technical act of teaching to a test.

Concluding thoughts

This reflection on practice has helped us realise that the characteristics of effective learning are important for all stages of teaching and learning. While most early years practitioners are aware of the importance of these characteristics, those who teach other stages of life may not be. Our, admittedly small and self-selected, sample of higher education lecturers and other colleagues tended to emphasise the importance of active learning, collaboration and discussions in promoting the learning of their students, but under-emphasised the importance of play, creativity and critical thinking. This surprised us because creativity and criticality are key 21st century skills (Vincent-Lancrin et al., 2019) and are explicitly mentioned in our university assessment criteria.

Our conclusion and contribution to thinking about teaching and learning is that educators at all stages of life need to slow down and play together, allowing the time and space for creative, critical thinking. In doing so, we acknowledge the foundations of transformative learning experiences to ensure that students develop the skills and characteristics necessary to thrive. We invite educators working with students from 4-104 to consider how they can embed the characteristics of effective learning in their practice.

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Jeanette Simpson presents her doctoral work: *Exploring Home Educated Children's Experiences of Learning*

Olivia Richards presents her doctoral work: *The Story Project: An exploration of teacher's perceptions of the effectiveness of stories and The Story Project as*

Joel Kelly, The Blue School, opens the conference with his keynote address: *Social Justice Mathematics in*

Abbe Brady, Mel Healy, Sara Daniels and Laura Davies's (St Mary's University: Faculty of Sport, Technology and Health Sciences) work entitled *Academics' reflections on the personal and professional impact of using service learning*
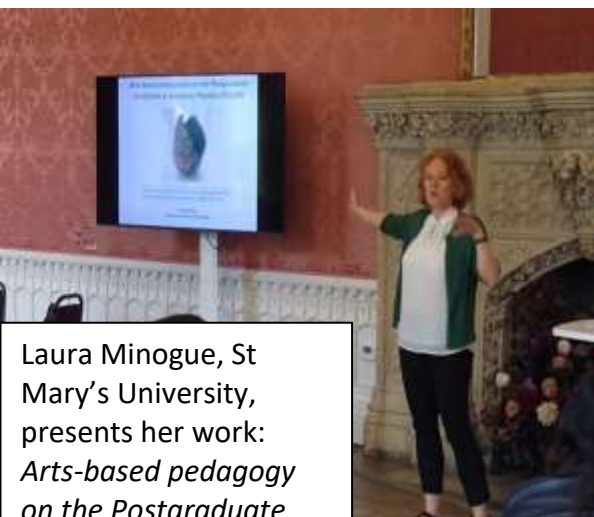
Laura Minogue, St Mary's University, presents her work: *Arts-based pedagogy on the Postgraduate Certificate in Academic*

Karen Fox and Jo Head, St Mary's University, present their work: *A pilot study of interactive outdoor writing experiences*

Reflective Practice

Paper 5: Arts-based pedagogy on the Postgraduate Certificate in Academic Practice

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Abstract
What follows is a reflection on integrating arts-based pedagogy (ABP) into the Postgraduate Certificate in Academic Practice (PGCAP), a course for early career academics with less than two years' teaching experience in Higher Education. The PGCAP aims to provide a broad introduction to learning, teaching and assessment in Higher Education but also invites participates to reflect deeply on their beliefs and assumptions about teaching. The course provides a community of practice for new lecturers and a space in which to discuss the challenges, frustrations and joys of lecturing. I have found that arts-based pedagogy encourages deeply reflective conversations to take place in the classroom and that these conversations contribute to the building of rapport amongst the participants. Three types of arts-based pedagogy will be discussed: photo elicitation; the use of postcards; and the impact of collaboration with the Drama department.

Introduction
The Postgraduate Certificate in Academic Practice (PGCAP) is an academic and practice-based course for early career academics. Becoming an early career academic may be a challenging career transition (Sutherland, 2011) although potentially offers much opportunity for personal and professional growth. To be an educator is to acknowledge ourselves in the classroom and furthermore to begin to understand that emotions are intrinsic to learning and that any learning may provoke a range of feelings (Mortiboys, 2012). Teaching then, is never simply the transmission of information or the imparting of knowledge, but a participatory, collaborative process between the teacher and the students and amongst the students themselves.

The PGCAP offers early career academics a space for acculturating to learning and teaching practices in the academy. It is widely acknowledged that new lecturers hold beliefs about teaching that stem from their original discipline and about teaching in general (see Gibbs, 2014 and Jarvis-Selinger et al, 2007). This is often, but not always, linked to the idea of teaching as transmission of knowledge and the lecturer as expert. The PGCAP invites participants to make explicit these beliefs to themselves and the wider cohort with a view to gently questioning and developing pedagogic practice. Arts-based pedagogy (ABP) enables a 'way in' to this discussion whereby beliefs can be revealed rather than confronted. ABP also plays a role in encouraging connections amongst the participants on the course (Gravett & Lygo-Baker, 2024) and offers a counter-narrative to the current neo-liberal, metrics-bound culture in Higher Education.

The reflections in this article are based on six years of leading, teaching and marking on the PGCAP. It is a privilege to meet and teach early career academics and be part of their transition to Higher Education, knowing as I do the intensity of the journey and the steep learning curve. I acknowledge that there is strong potential for author bias particularly since I am a passionate advocate of the PGCAP and believe that it enhances the experiences of early career academics. I also derive immense personal and professional satisfaction from working with early career academics when they first begin teaching. My reflections are based on both formal and informal opportunities to

consider the course. The formal reflections take place during meetings with the programme team, the moderation of marks, the Exam Board and subsequent Annual Review. Informal reflections are notes I make for myself during each academic year and conversations in person and via email with participants. This article is a composite of all these. It is not a research study and I have not sought ethical approval although I do have permission to use feedback from emails with former participants.

Arts-based pedagogy (ABP)
Arts-based pedagogy (ABP) is a "teaching methodology in which an art form is integrated with another subject matter in order to impact student learning" (Rieger et al, 2015, p.102). There are three broad forms of ABP: the first involves participants engaging in the artistic process itself, by creating, drawing, sculpting or taking photographs. A second form is where participants consider and react to an art form to develop their knowledge of another discipline (Hunter & Frawley, 2023). One example of this approach is the use of postcards to stimulate reflection and discussion. A third form of ABP is the involvement in a performance such as a Drama workshop. In using ABP on the PGCAP, I have drawn on all three of these approaches. Photo elicitation requires participant to select and frame a view, taking a photograph from their own perspective and as such is a creative and personal process. In looking at, selecting and reflecting on the visual images provided by postcards, participants are undertaking the second approach. And finally, the collaboration with Drama has required participants to take part in specific Drama activities and discussions relating to teaching and learning. However, I would add another dimension to the use of ABP which is that participants are not just learning about a discipline (in this case academic practice in Higher Education) but are learning about themselves.

The postcards that are chosen and the photographs that are taken reflect to the participants what they think, feel and see. Engaging in this process facilitates a different way of seeing, bringing into view feelings and insights that were not previously visible. I was drawn to using ABP by a personal inclination towards bringing the visual and creative into the classroom and because, as an educator, I was seeking different ways to make visible the embedded beliefs and assumptions we all carry in relation to teaching (Gibbs, 2014 and Jarvis-Selinger et al, 2007). When presented with a visual image, whether new to us or one of our own making, as Leavy notes, "our response may be visceral, emotional, and psychological, before it is intellectual" (Leavy, 2018, p.3) thus creating or reacting to an art form bypasses the rational mind and enables access to a more imaginal and emotional response.

There is a small body of research which has explored the effects of using ABP in the classroom. Eaves (2014, p.147) reports that students find these approaches "engaging, accessible and empowering, with nuanced capabilities to alter relationships with phenomena, experiences and people" whilst Hunter and Frawley (2023) found that ABP encourages deeper levels of thinking and analysis. In addition, as Berger eloquently writes, "we never look at just one thing; we are always looking at the relation between things and ourselves" (Berger, 1972, p.9). It is in this space where we ponder our relationship to the 'thing', object or visual that is imaginal, creative and reflective. Using photographs and postcards is a way of using images as mediating artefacts between the person and their thoughts and feelings, stirring "alternative ways of thinking about the subject at hand" (Coe et al 2021, p.133), of which we may be barely conscious. Within the context of a course for early career academics, this serves to unsettle existing assumptions, invite new connections and surface awareness of the emotions connected with teaching.

Below, I will discuss how I have used photo elicitation, postcards and collaboration with the Drama department to bring arts-based pedagogy into the PGCAP course.

Photo elicitation

Photographs are polysemic; they carry multiple meanings both literal and metaphorical. They also capture a specific moment in time enabling a more direct connection with the emotions and feelings relating to a person's experience of the world (Hidalgo Standen, 2011). Photo elicitation, that is inviting participants to take their own photographs can, in this way, offer "a visual dimension to the unobservable thoughts, feelings, experiences and understandings" (Richard & Lahmann, 2015, p.4). As an induction activity on the PGCAP I invite new participants to take a photograph at St Mary's University. The photograph they take represents the university through their eyes and also anchors them to a particular place and time as they embark on the new role of lecturer in Higher Education.

In this activity, participants bring their photograph to the first session and share them in pairs. Photographs are taken anywhere on campus or even on the journey to work and enable important conversations about the decision to make the career transition to academia and the connection to the university. Whilst I have not in the past asked to see the photographs, participants have later reported to me how much they enjoyed the activity and how much it made them reflect on themselves and their journey into academia. In addition, this activity seems to facilitate the connections amongst the participants on the first day of the course. Building this community of practice with other new lecturers is an important element of the PGCAP and helps to address feelings of imposter syndrome.

Postcards

The postcards I use in my teaching are from my own collection, bought in galleries, museums or other visited places. The images on the postcards are mainly of art, architecture or places in nature. I bring these postcards into the teaching space to provoke reflection and stimulate conversation. I use the postcards as suggested by Curry and Ward (2014, p.101), as" a device to enable dialogue in groups that allows participants to connect together past, present and futures, to build new stories about the future, and to put themselves in the picture". Ways of utilising postcards include choosing a postcard to surface reflections on tricky teaching moments; prompt discussions on the role of the teacher and/or student; as a way of checking in or taking stock and finally, by writing postcards to a future or past self.

Each postcard activity begins with spreading out a range of images on a large table and inviting the PGCAP participants to look at the postcards and identify which postcard(s) they are drawn to. It is important at this stage not to 'overthink' it and to be guided simply by what resonates or appeals rather than getting drawn into applying a rationale for the choice. Then, usually in pairs, participants will talk through why they chose that card and how for them it connects to the topic under discussion. The choice of postcard is very personal and the resulting discussions thus have a particular meaning and resonance for participants.

A memorable example of using the postcards to take stock was when I did this activity with PGCAP participants in semester two. March is a challenging time for lecturers in their first year of teaching. They are halfway through semester two and generally in the midst of another round of assessments. Marking is a new skill which must be acquired and which is often very time-consuming. March seems to be a pivotal moment, at the same time in the thick of the action but with a sense that the end of the academic year is in sight. Using the postcards prompts more emotional reactions to that moment in time prompting reflection on past, present and future. The value of the professional reflection here is in acknowledging feelings of being overwhelmed yet feeling a sense of solidarity with others in the same situation. A final example of postcards in the classroom is to use them for participants to communicate with themselves from the past or future. For example, writing to a past or future self with messages of support, guidance and encouragement. This activity can be adapted depending on the context.

Drama

Throughout the PGCAP, I curate a series of guest speakers from across the university. This varies each year but one collaboration that has endured for the past four years is the work with the Drama department, specifically the Head of Drama. Each year I have invited him to make a contribution to the PGCAP providing a short brief which has been interpreted in different ways.

The first invitation was in 2020. We were mid-pandemic and all PGCAP teaching had moved online, thus this was an online guest lecture in which teaching was spoken of as a visceral act, a moment of communion with people in a room which would never happen again. He encouraged his audience to consider how they take ownership of a space (whether online or in person) in order to really inhabit it and connect with the students they were teaching. A powerful message from this talk was that all teaching is fundamentally relational in nature.

In 2021, we were back on campus and so we were able to arrange a real Drama session in one of the studios. Participants made 'living statues'; working in pairs, they shaped each other into sculptures of 'father' and 'mother'. There was a stage where participants were sculpting and a stage where we paused and looked at the sculpture before moving on to discuss their meaning. This opened up a wide-ranging and imaginative conversation which touched sensitively on people's ideas, gently prodding at preconceptions and stereotypes. Had there been more time, this workshop would have continued to incorporate the role of Teacher.

In 2022, the third year of collaboration, there was less time available and so the guest talk took place in a traditional teaching room with a computer and screen and rows of tables facing the front. The talk this time invited participants to consider the space, to consider the assumptions that had been made when the space was designed and the lack of room (literally) for alternative ways of being in the room.

In 2023, mindful of the restrictions of the previous year, we agreed to bring the PGCAP participants to a Drama studio again so as to be back in a very different space from the one in which they were all teaching. The cohort this year were teaching in three main spaces: labs, classrooms and lecture theatres. Again, a major point was made about how the setup of a room conveys particular messages about how that room could and should be used. The encouragement this time was to subvert this structure and to consider how each of them might be able to influence the spaces where they teach.

Feedback from participants in this cohort revealed that the message had landed deeply and this was conveyed in their reflective portfolios; many wrote about how they had never considered space in this way and that it had deeply influenced their teaching. For myself as the Course Lead, whilst undertaking teaching observations for the second module of the PGCAP, I noted how one lecturer had responded to the suggestion to claim the space. For the session I observed, he had moved the chairs and tables from their traditional rows into a horseshoe, more suitable for the debates he encourages in his subject. In an informal email conversation, another participant wrote that the Drama session had made him realise that the physical environment could have an impact on learners' experiences and engagement, noting the importance of where the lecturer stands in a room and how moving from one side to the other enables different connections to form. Another former participant arranged to take her students into the Drama studio to practise presentation skills noting that this was a great experience enabling the enhancement of communication and body language skills.

Reflections

Using arts-based pedagogy on the PGCAP has evolved organically. I never set out to embed these approaches, rather they arose through my own interest in images and creativity and in stimulating different ways of seeing which I view as essential to deep reflection. At the core of the PGCAP is a focus on reflective practice as a way of developing professionally. This can be undertaken in a surface level way or it can lead to profound realisations and potentially changes in practice. Many assumptions about teaching and learning are deeply held, partly because many of us have spent years of our lives in education. For those who become lecturers, most have also completed further university studies such as a Master's degree or PhD, at times further entrenching a particular view of teaching. During the PGCAP, I aim to provoke reflection such that the participants will make visible to themselves their beliefs and assumptions. ABP facilitates these reflections by moving away from the rational, cognitive mind and towards the imaginal and emotional.

Conclusions

Using arts-based pedagogy has felt meaningful to me and I feel has given the participants a different way of seeing. In the midst of a Higher Education sector with a strong focus on metrics and quantitative ways of evaluating success, it is also vitally important to keep hold of what makes us human, what lights a spark and what reaffirms our purpose in being educators. I like the way that creating or responding to visual images brings forth something hitherto hidden and evokes responses closer to our feelings than our cognitive thinking. In conclusion, I feel that arts-based pedagogy has huge potential to make visible beliefs and assumptions, develop the relational aspect of teaching, strengthen connections amongst participants, nurture the imagination and encourage more creative ways of thinking, seeing and reflecting.

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Paper 6: How can reflective practice be used to support the effective transition of primary teachers to teacher educators in Higher Education (HE)?

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Abstract:
This article documents my reflective journey transitioning from a primary school teacher to an Initial Teacher Education (ITE) lecturer in higher education (HE). It explores the research behind how to support effective transition and the value of reflective journaling. Throughout my transition to HE, I used the steps outlined by Bassot (2020) to reflect upon the various opportunities and challenges I faced in transferring my knowledge and skills to my new context. Having reached this stage of my journey, I propose that reflective journaling is a valuable tool to support transition and I make recommendations for how those embarking upon this career change may utilise this approach.

Key Words: Reflective journaling, Transition, Higher Education (HE), Teacher Educator (this term is used synonymously with 'lecturer' during this paper, as the focus is on teachers becoming educators within Initial Teacher Training)

Introduction:
Many lecturers come from a research background in their own discipline but may not have received any formal training to support them in transferring this knowledge to others through teaching (Harland, 2012). By contrast, those from a teaching background may have practical skills and knowledge but will not fit the mould described by Harland (2012). This was certainly true in my case when I made the move from teaching in a primary school to working as a teacher educator. My personal experience of this journey motivated me to research the factors that can support primary teachers transitioning to the role of HE lecturer.

Existing literature on transferring knowledge and skills from primary education to HE confirms the themes identified by Dinkelman, Margolis and Sikkenga (2006): a shift of professional role identity; understanding the new institutional and cultural context; developing new frames of knowledge and understanding; and access to support and developmental opportunities. These opportunities may include induction programmes, mentoring or academic qualifications and action research that support reflection on teaching and learning within the HE context.

McIntosh (2010) believed reflection to be the most valuable aspect of action research, and it is my reflection that informed the small-scale project I conducted as part of my Post Graduate Certificate of Academic Practice (PGCAP). My aims were twofold: first to identify the strategies that support effective transition, and second, to use reflective practice to evaluate my first year as a lecturer. This process has supported my continuing professional development and enabled me to offer support and recommendations to others making the same career move.

Literature Review
Ziechner (2005) proposed that primary teachers should make a smooth transition to work in HE, however, McKeon and Harrison (2010) point out that this transition involves different identities trying to establish dominance, making it far from straightforward. The main aspects for successful transition can be categorised around the themes identified by Dinkelman, Margolis and Sikkenga (2006): shifting role identification, understanding the institutional and cultural context of HE, developing new frames of knowledge and understanding and identifying support and development opportunities.

Shifting Role Identification

Arnott (2017) suggested that, during career transitions, the identity of new teacher educators is constantly shifting as they explore different identities for different purposes in their new context. During this time, they can be said to be in a state of 'becoming'. Ashwin (2015) maintained that the values that new teacher educators hold have a clear link with establishing purpose and these are integrated in ITE. Keeping core values present is vital as they are transferrable from primary education to HE. Sharing common goals with colleagues can lead to collaborative practice and collegiality. Wenger (1999) concluded that identity can be developed through a community of practice where commonality of interests or passions can support learning and improvement: the shift in identity may not come necessarily straight away, but continuing to learn and work within a community of likeminded individuals will support this.

Understanding the Institutional and Cultural Context

The concept of lecturers as researchers is significant in establishing HE identity. Murray (2010) notes that a focus on developing the skills around research will be a predominant aspect in the development of a new HE lecturer. This is consistent with Ashwin (2015) who outlined the need for research to improve pedagogy. However, Carillo and Baguley (2011) raised concerns that there can be pressures around undertaking research in some universities, which can be a potential barrier to new educators. Similarly, Labaree (2003) contended that one of the main challenges faced by schoolteachers moving into the university sector is the difficulty of conducting research, due to the multifaceted nature of the role.

Minogue's (2019) Layers of Reflection (see Figure 1) gives a frame for understanding the multidimensional nature of working in HE. While developing subject knowledge and teaching skills, new lecturers are also learning about the institutional and cultural context within their own university and within the field of HE more widely.
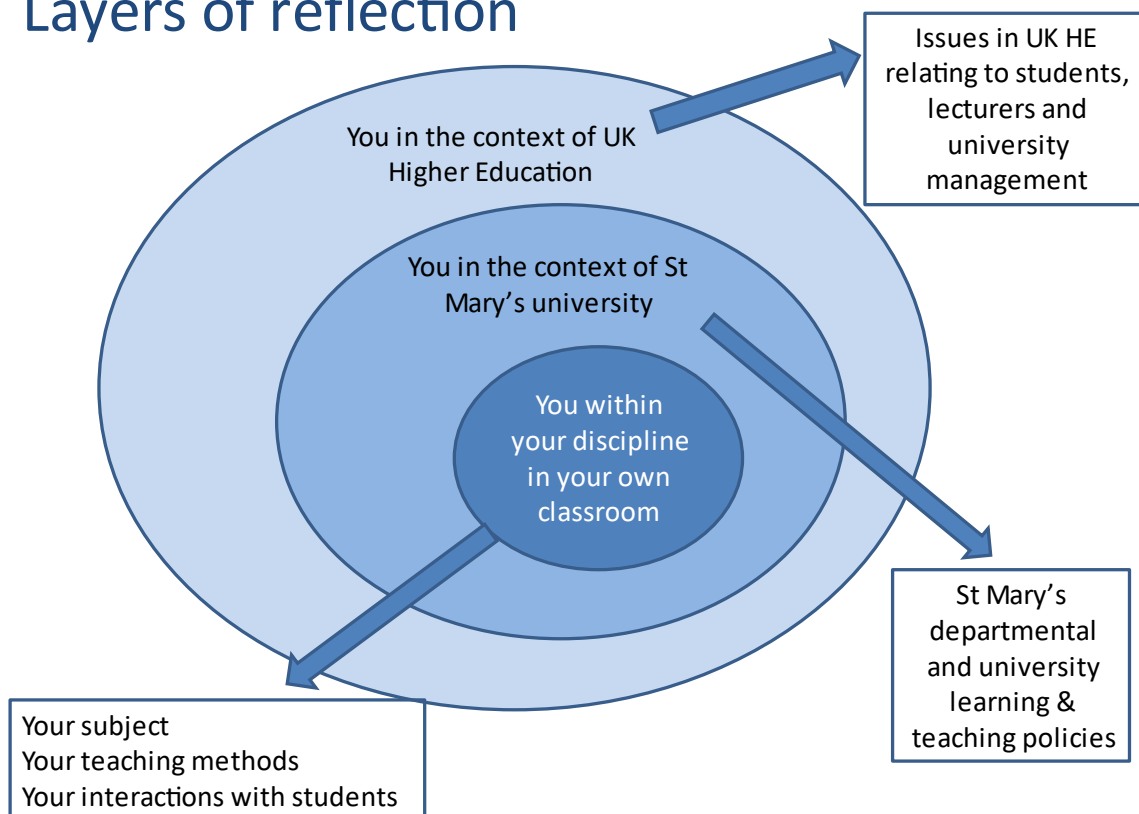
Layers of reflection

Figure 1: Minogue's (2019) Layers of Reflection

These layers overlap and interconnect, so although they can be considered simultaneously. Prior experience and transferrable skills can be employed here to reflect on each layer discreetly as new lecturers develop frames for understanding their new role.

Developing Frames of Understanding & Knowledge
Using past experiences and being able to reflect on time within school practice is beneficial for new lecturers as this knowledge and skills within teaching pedagogy can be used for aiding student understanding (Allen, Butler-Mader and Smith, 2010). Unlike in a primary school setting where teachers tend to work predominantly with one class, HE lecturers work across different year groups and may also work on different pathways. Understanding the needs of students on different programmes and at different stages of their academic journey is vital as this allows you to develop an emotional connection (Mortiboys, 2011).

As a new lecturer, it is important to understand the value of constructive alignment through linking curriculum learning outcomes, assessments and learning tasks (Biggs, 2003). Preparing for this could involve such tasks as utilising and collaborating with expert colleagues, organising your time for background reading or reviewing previous assignments to gain an understanding of university assessment levels.

Support and Development
Reflection is a critical part of the learning process. Ghaye (2011) highlights the psychological need for practitioners to focus on positive experiences, in order to not have a deficit-based approach. Conversely, Osterman (2004) believes that reflection on problematic experiences allows for identification of problems and clear actionable steps to create solutions. With support and guidance from line managers or expert colleagues, new lecturers can reflect on both positive and problematic experiences during their induction period.

Amott (2017) acknowledged that appropriate induction for new staff is needed, which assumes that a shift in identity will automatically follow. Izadinia (2014) identifies four features of successful induction: having opportunities to be a part of learning communities, supportive relationships, reflective activities and research. It is essential for new members of staff to have time, space and access to each of these aspects, in order to successfully transition from primary teachers into HE lecturers. However, it is important to consider aspects from different viewpoints. Brookfield's (2017) Four Lenses of Critical Reflection helps practitioners to step back and consider experiences from the viewpoint of not just ourselves, but also that of students, peers and in relation to theory.

Methodology
In keeping with the reflective theme of this research, qualitative data was the appropriate choice for collection as the question required evaluation of experiences, thoughts and emotions; journaling can provide flexibility of depth and inclusivity (Holme, Robb & Berry, 2016). However, Holme, Robb and Berry (2016) caution that qualitative data is highly subjective as it consists of opinions and emotions. This can be a potential limitation in some cases but the reflective nature of this particular study mitigated this concern.

A reflective diary was used as the research tool, where ideas could be linked and meaning determined from them (Bassot, 2020). Bassot (2020) identified a three-step process to effective reflective journaling: to reflect, analyse why different actions/feelings have taken place, and action based on what has been learned. These steps were adopted for an 8-week period of weekly journaling, documenting my lived experience as a new lecturer. Clarke and Braun's (2017) framework for thematic analysis was then used, in accordance with the key themes discussed in the literature review, ensuring accessibility and organisation of prominent themes.

Findings

The reflective diary was analysed using the themes identified by Dinkelman, Margolis and Sikkenga (2006): a shift of professional role identity; understanding the new institutional and cultural context; developing new frames of knowledge and understanding; and access to support and developmental opportunities.

Shifting Role Identification

As my role shifted, it was important to reflect on transferrable skills and knowledge that my previous experience could provide. Multiple links were found throughout the experiences journaled in the diary, which built confidence. Being able to utilise and refer to previous examples in teaching developed authenticity and purpose with students. Taking full advantage of collaborative opportunities helped consolidate my place in the learning community and this, as Wenger (1999) stated, helped me develop confidence in my new identity. Whilst one may want to shy away from challenging areas, it was important to invest time in activities to develop these.

Following a reflective session on school placements for final year students, where they were able to discuss progress made so far and share best practice, I reflected:

> *'Leading a session on Best Practice Day built my confidence in this area of mentoring, as I was able to refer to my own experience in teaching Year 6, my experience of school placements from my teacher mentor and link tutor roles, in order to support trainees' reflections during placements.'*

Sharing reflections of my own experiences in schools was a powerful and relatable way to help students to develop an understanding of pedagogy (Allen, Butler-Mader & Smith, 2010). During this session, I was able to use my previous experience as a teacher to support students developing their teacher identity through sharing my own reflective practice. The goal of developing trainee teachers so they can become effective future teachers is the vision we hold strong for all activities we do with students and this established purpose supports the shift in identity that takes place when primary school teachers move into HE (Ashwin, 2015). In this case, my authenticity gave me authority and enabled me to shift from my teacher identity to that of HE lecturer.

Understanding Institutional and Cultural Contexts

In line with Labaree's (2003) observation, the steepest learning curve I faced during my first year in HE was around understanding my role as a research tutor. Developing my own understanding at the same time as supporting the students led to feelings of inadequacy at first but continuing with the process ensured that there was a clear understanding of the Level 6 dissertation module and expected outcomes. I reflected:

> *'The process of working with a group of students on their Level 6 research project ensured that my understanding developed for this area, as it was limited to start. Marking alongside more experienced colleagues allowed me to comfortably develop my feedback skills, share grades and discuss strengths and development points. I found this very helpful.'*

Working with colleagues in this way helped me to understand the institutional and cultural context around research. This understanding was developed further through the PGCAP which allowed me to develop my own research skills in a safe, supportive space within a community of practice which built upon a shared purpose.

Understanding Frames of Understanding and Knowledge

An area of expertise for teachers is developing relationships with students; this was utilised in creating positive relational environments with students and tutees (Mortiboys, 2011). Understanding student

characteristics is key so that modules are pitched at an appropriate level and pastoral support, as well as academic support, can be provided for students. In my journal I reflected:

> *'In a final session with a Level 3 group, we summarised student learning from throughout the module in a peer quiz format – low stakes assessment task to ensure engagement, develop their confidence and determine understanding. Student feedback summarised that this was a supportive process.'*

Working across programmes meant developing an understanding of different pathways and related characteristics, which then led to more impactful teaching sessions and better connections with students. Using the expertise of colleagues to support planning, teaching and assessment for Level 3-6 groups developed an understanding of expectations across HE through an awareness of constructive alignment (Biggs, 2003). When lecturers create an environment with accurate triangulation of module outcomes, assessments and learning tasks, students then have maximum opportunities to learn and make good progress.

Support and Development

During the course of my first year, I worked collaboratively with an experienced colleague on a taster session for potential new students. This supportive process developed an understanding of the recruitment aspect of my role in relation to the wider university context. Wenger's (1999) Communities of Practice can be seen here in my reflection:

> *'Planning a RE taster session for potential new students involved collaborative work with a colleague, planning activities around what RE provision is offered here. My previous experience of subject leadership has helped with planning and running training sessions. My colleague was supportive, and we developed practice activities for potential new students.'*

As noted by Izadinia (2014), having opportunities to develop aspects of the HE lecturer role through appropriate activities such as shadowing and peer teaching are vital in the first year of a new role. Using the expertise of colleagues within your community allows for observation and modelling to take place, which can then lead to confidently developing aspects of your role outside of your classroom discipline.

Looking back at the reflective diary, there was an emphasis on focusing on the viewpoint of self, (with some examples of students' perspectives), so it is important for me to widen this outlook for future development (Brookfield, 2017). There is a balance of problematic and positive experiences reflected on, which Ghaye (2011) and Osterman (2004) believe helps with professional identity and growth. These reflective practices should continue to be utilised in the future.

Conclusion

It is important to note that this was a small-scale project, and as such, limited conclusions can be drawn. Transitions are experienced subjectively, and my experience will be different to that of others. However, the process of reflective journaling supported me on this journey and enabled me to draw a number of conclusions about how to support others.

First, understanding the context of a lecturer within UK HE (Minogue, 2019) can be achieved by taking part in professional development opportunities, such as attending research seminars or conferences for your subject discipline or other areas of interest. Utilising texts that are specifically targeted for new lecturers, such as Mortiboys (2011) and Bale and Seabrook (2021) provide practical strategies and advice for new starters.

It is also important to recognise and adapt to your place within the institutional context (Minogue, 2019). This can be achieved in a variety of ways, such as: engaging in collaborative practice with

others. This can involve planning, teaching observations (of peers and yourself) or paired/team moderation. It is essential to develop your Community of Practice (Wenger,1999). Taking advantage of opportunities to buddy up with new staff across the university can lead to forming a professional network. There are many opportunities to engage with the wider university community once established in your role and these enable you to build upon areas of interest or further passions.

The process of reflective journaling has shown me that my own classroom discipline can be the starting point for reflection. This is central to transition from Primary to Higher Education and should start with understanding what transferrable skills I possess. Sharing my past experiences and expertise with students can lead to authenticity within my discipline. Taking the time to develop relational learning environments with different groups by getting to know the needs of different programmes will create a purposeful and safe learning environment for all. Biggs' (2003) work on constructive alignment is a valuable model to use in order to support this.

Through this small-scale project, I learned that there is strong value in reflective journaling and analysis as a means of supporting career transitions from primary education to HE, and that the process of reflective journaling can lead to forward-thinking action. This, alongside the continuation of professional development and collaborative practice, can positively impact effective career changes and ensure high quality provision for students. Reflecting on my next steps as a HE lecturer and how I can share what I have learned with others, I can see that the greatest transition that takes place when moving from primary to higher education is not in how we are seen by others but in how we see ourselves.

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Paper 7: A conversational journey for professional development through an epistemically insightful lens.

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Abstract

Previous research in Epistemic Insight (EI) has focused on the foundational knowledge of individual disciplines. This reflective piece offers new perspectives on how cross-disciplinary discussions about EI can challenge participants to interrogate their fundamental beliefs about the nature of knowledge in their field, in ways that do not occur during professional conversations between experts in the same discipline. As teacher educators in primary mathematics (Nic) and science (Rob), we use Borton's three stage reflective process, What-So-what-Now-what, to explore how our positioning within our respective communities of practice evolved during conversations prompted by critical incidents which arose during our teaching collaboration. Our interrogation of disciplinary similarities and differences allowed us to recognise and find a way through the limitations of communities of practice which unilaterally frame definitions of expertise within a field. We emphasise the value of developing communities which are both multi-disciplinary and deliberately focused on the nature of knowledge rather than addressing issues of performativity. We have not written a traditional research report, instead, this article is structured to follow our developing conversations and awareness because these conversations prompted reflection about and critical interrogation of our practice as teacher educators. As well as highlighting the power of EI to promote conversations about disciplinary knowledge, this conversational journey also shows that developing epistemic awareness can offer a counter-narrative to the instrumentalization of mathematics and science teaching.

Introduction

Our conversational journey begins with the preparation of a lecture introducing the Epistemic Insight (EI) project to first-year undergraduate students on a work-based route degree in primary education. Rob, a teacher educator in secondary science, was responsible for embedding EI into the university's curriculum provision. The aim of the EI project was to support students' examination of the unique nature of knowledge in individual disciplines and to experience how blending different disciplinary voices provides holistic answers to real world questions. Consequently, Nic, a teacher educator in primary mathematics, felt that it would constitute a useful conclusion to a module studying how mathematical understandings are developed. Our original intention was to write a research paper on how the lecture had influenced the ideas and practice of the students involved. During the writing process, however, the value of the reflective journey we had engaged in through conversation, revealed itself to be of greater importance for us than our original focus. This paper, therefore, does not follow a conventional structure and we have deliberately avoided the use of terminology such as 'findings', preferring instead to use Borton's (1970) reflective framework to explore how our conversational journey led to a number of realisations which have significantly altered our teaching and research practice. This evolution is, in our eyes, the definition of transformational professional development.

The purpose of most teacher professional development is to improve student outcomes (Borko, Jacobs and Koellner, 2010; Van der Klink, et al., 2017). Even when the focus is to prompt change in teaching practice or teacher subject-knowledge, evaluation generally occurs through student-based measures (Garet, et al., 2001; Hill, Beisiegel and Jacob, 2013). Whilst research into professional development is almost exclusively focused on planned, structured interventions (Colling and Smith, 2021), we argue that these structures provide a limited view of how, and what, teachers learn (Webster-Wright, 2009). Our journey demonstrates that collegial interaction can often provide the

impetus for sustained changes in thinking and, consequently, practice, which more formalised programmes measuring the quality of teaching based on student attainment and student satisfaction often fail to achieve (Kitchen, Ciuffetelli Parker and Gallagher, 2008; Selkrig and Keamy, 2015).

Borton's (1970) 'What, so what, now what?' framework, designed to support learning from critical incidents, reflects our individual and joint learning journeys so well, that we have used it to provide the structure for this article. The critical incidents which launched this, now two-year long, conversational journey have led to a series of realisations that reflect the transformative power for practice of cross disciplinary conversations. We suggest that positioning disciplinary knowledge as boundary objects and using it to interrogate the similarities and differences between subjects, highlights epistemic distinctiveness more effectively than intra-disciplinary inquiry which does not automatically involve consideration of the nature of disciplinary knowledge. This debate about the epistemic distinctiveness of an individual discipline has highlighted the limitations of communities of practice in framing definitions of expertise in a field and the value of developing communities which are both multi-disciplinary and deliberately focused on the nature of knowledge rather than addressing issues of performativity. Finding a way through these limitations has allowed for critical exploration of our positions within our disciplinary communities of practice and heightened awareness of our own positionality in research. These conversations have offered us a counter-narrative to the increasingly instrumentalised nature of mathematics and science teaching by forcing recognition of the humanness of knowledge creation and application. As such, EI has proven to offer far more than originally intended or anticipated. Last, but not least, we hope to show how a cross-disciplinary conversational journey can engender critical professional reflection and ongoing professional development.

We aim to take the reader on a journey through our discussions about our practice and subsequent reflexivity. To do so, our writing adopts a conversational style that deviates from dual-authored research publications. We reflect on how our conversations constructed new communities of practice. Although we resist constructing a theoretical framework for our research, some level of background is required to provide the reader sufficient guidance to follow the themes that emerge. We will then explore our individual stories about how it has reframed our practice and research before concluding with ongoing actions we are undertaking.

Background: Why is it important to discuss disciplinary knowledge?
From the outset, it is imperative to highlight our individual positionality within these our conversations. Nic is a senior lecturer in primary mathematics, thus she is working with preservice teachers who will be required to teach a range of disciplines in an individual classroom. Many of the preservice teachers Nic works with will not hold a qualification in mathematics beyond a general certificate in secondary education (GCSE) which students sit, aged 16, in England. By contrast Rob is a senior lecturer in science education and leads the Secondary science post graduate certificate in education (PGCE) with qualified teacher status, (QTS) course. The preservice teachers Rob works with hold degrees in science or related fields and will almost certainly have studied at least one of the three sciences (biology, chemistry or physics) to A-level standard or equivalent.

Initially one might therefore assume that Nic holds a stronger justification for discussing the unique facets of mathematical knowledge with her students, as the science preservice teachers Rob supports may have previously interrogated the distinctive features of scientific knowledge as part of their degree. However, extensive research (Abd-El-Khalick, 2012; Lederman, N.G. and Lederman, 2019; Lederman, N.G., Lederman and Antink, 2013) suggests that learners rarely have opportunities to reflect upon their beliefs about scientific knowledge, how it is constructed or how such knowledge is distinctive from other forms of disciplinary knowledge. Indeed, recognising that learners, irrespective of their level of expertise, struggle to articulate how scientific knowledge is unique, aligns with Russ'

(2014) contention that epistemology of science is fluid, personal and challenging to define. Although some work highlights that specific interventions focussed on investigating how scientific knowledge is distinctive can develop expert and defendable beliefs about the distinctiveness of science (Lederman, N. G., et al., 2001), these courses are often labour and time intensive. Consequently, the preservice teachers Rob works with are unlikely to have studied the epistemic foundations of scientific knowledge.

The EI project, which defines Epistemic Insight as "knowledge about knowledge" (Billingsley, et al., 2018, p.1121), seeks to empower teachers and teacher educators to explore big questions through a multidisciplinary lens. Adopting an epistemically insightful approach to teaching can support school children (Billingsley, et al., 2018), preservice teachers (Billingsley, Campbell and Dell, 2020) and teacher educators (Billingsley, et al., 2023) to appreciate the types of questions that are amenable to individual disciplines alongside "bigger" questions that require a wide range of disciplines to work in unison to construct an answer. Therefore, EI provided a valuable framework for Nic to reflect upon how she supported primary preservice teachers to articulate the distinctiveness of mathematics.

Lave and Wenger's (1991) concept of communities of practice was central to how we saw fundamental changes in our positionality. Wenger's (1998) conceptualisation of learning as a trajectory through, across and around a community of practice provides way to consider less structured forms of professional development, in particular those that arise from encounters with people external to existing communities of practice (foreign competencies), aka Rob, (Wenger, 1998, p.211). We argue that, as teacher educators working within a power structure imposed by a recent governmental review of teacher education (Department for Education, 2019; Hordern and Brooks, 2023), which compartmentalises teacher education into subject specialisms, the limited potential for cross-disciplinary and cross-phase collaboration stifles a rich source of reflexive professional development. Cross-disciplinary conversations about knowledge challenge the limitations of intra-disciplinary communities of practice, allowing more critical examination of the reasons and motivations behind our instructional decisions and how they influenced the development of our practice.

What? Two critical incidents
In England, both primary and secondary initial teacher education is taught by discipline-specific experts, in ways which fail to highlight epistemic distinctiveness. Consequently, conversations about the uniqueness of disciplinary knowledge have little occasion to occur and epistemic assumptions about the nature of knowledge often remain unchallenged across all levels of education (Billingsley and Hazeldine, 2020). Whilst EI supports students in developing awareness of the nature of knowledge in individual disciplines, it does not force the educator to critically examine their own epistemic beliefs. As such, a multi-disciplinary EI project could be implemented by a group of teachers, each within their own discipline, without them engaging with their own ideas about disciplinary knowledge, even while encouraging their students to do so (Billingsley, et al., 2023). In contrast, the collaborative development of our cross-disciplinary lecture about epistemic distinctiveness provided fertile ground for refining our perceptions of the nature of our disciplines and our positionality within them. Intrinsic to this learning journey were our respective critical incidents, described in this section, which acted as catalysts for ongoing professional learning through conversation. These incidents began the shift in focus from our original research plan to reflection on how moving beyond EI proved more impactful on our practice.

Critical Incident #1 – So Nic, what's distinctive about mathematics?
In our first meeting to prepare for the lecture, Rob asked me to define what was distinctive about mathematical knowledge and ways of knowing. Given our aim of prompting preservice teachers to consider the purpose, nature and unique powers of mathematics in the lecture, the unexpected

difficulty I faced in formulating a clear definition provided the first reflexive step in dialogical professional development.

As educators, we sit within multiple communities of practice (Cyrino, 2020; Lave and Wenger, 1991; Wenger, 1998). We participate fully in some and sit further towards the fringes of others. Our position in each community of practice is fluid, evolving as we gain competence in the practices which characterise membership (Wenger, 1998). Also in a state of evolution, however, is our perception of what constitutes competence within a community of practice. As teacher educators, we recognise that the perceptions of competence acquired during our own initial teacher education were quickly replaced by greater expectations after qualifying and gaining more comprehensive experience in the classroom. If greater interest was taken in a particular subject, the characterisation of a successful teacher developed further, encompassing an awareness of deeper, relational understandings and pedagogical content knowledge (Ball, Thames and Phelps, 2008; Shulman, 1986). The ability to articulate the knowledge and skills particular to this community of practice is, therefore, indissociable from developing competence (Lave and Wenger, 1991). The ability to articulate disciplinary distinctiveness, in contrast, is not.

Whilst mathematics as a significant and distinctive form of human knowledge (Ernest, 1991) is implied in the purpose of study outlined in the National Curriculum (Department for Education, 2013a), it is noticeably absent from the curriculum aims and content. This instrumentalization of mathematics is not exclusive to England (Murgatroyd and Sahlberg, 2016; Sahlberg, 2023) and a delivery approach to teaching mathematics, characterised by task propensity (Gravemeijer, et al., 2016), has developed widely, promoting in students an image of mathematics as a disconnected collection of facts and algorithms, rigid and irrelevant to daily life (Ziegler and Loos, 2017). Just as the broader vision of the English mathematics curriculum intent is overshadowed by the technical focus of the curriculum content (Department for Education, 2013a), competence in teaching is primarily recognised for the practitioner's technical ability: the way they engage in teaching and interact with students, the instructional decisions they tend to make, the repertoire of routines, examples and experiences on which they draw (Ball, et al., 2008; Shulman, 1986). In contrast, the development of an epistemically insightful approach to teaching requires the articulation of a philosophy for mathematics, encompassing how it constructs a view of social reality, what can be known about social phenomena in that reality and how that knowledge is acceptably explained (Pring, 2015). It also requires an understanding of how those beliefs about the nature of mathematics impact on teaching practices (Tanase and Wang, 2010) and yet teachers are rarely asked to consider what they believe mathematics to be (White-Fredette, 2009).

Our conversations highlighted the extent to which our practice was influenced by preservice teachers', in particular primary preservice teachers', focus on self-efficacy (Geddis and Wood, 1997; Palmer, 2006) and subject-knowledge development (Bowie, Venkat and Askew, 2019; Verdugo-Perona, Solaz-Portolés and López, 2016). Consequently, already limited disciplinary understandings remain under-developed. Within our teacher education system, which prioritises school-based placements, we suggest that there is a strong need to develop the capacity to reflexively consider the epistemic foundations of individual disciplines (Hamed, et al., 2020) in order for educators at all levels to critically consider the implications these foundations have for their practice and beyond. In mathematics, for example, the lack of reflection about what mathematics is and does has helped to fuel, or rather left unchallenged, a pedagogical approach based within an exercise paradigm which fails to prepare critically active citizens (Skovsmose, 2014; 2023). The lack of critique is not a fault of the teachers, but rather a consequence of an education system where space for dialogue and critique is increasingly circumscribed.

Critical incident #2 – Labels do not equate to identity

I was the "expert" on EI responsible for introducing EI to the teaching curricula at St Mary's University. One of the activities we introduced in preparation for the cross disciplinary lecture was the big questions activity (see Table 1 below). In preparation for the EI session on the primary mathematics module, we discussed a range of 'big questions' (requiring insight from multiple disciplines), alongside questions with a single disciplinary focus. Up to this point, I assumed a significant level of epistemological overlap between mathematical and scientific knowledge. On reflection, this assumption was based upon my belief that scientific knowledge is explained using mathematical language rather than mathematics playing a more active role in constructing scientific understanding. Furthermore, this view of mathematics as a tool, common amongst scientists and other technologists (Ernest, 1991), rather than a construction, led to an assumption that only science utilised falsification as a mechanism to generate theory (Popper, 2014). Any question that could be falsified was a priori a scientific question. I consequently expected Nic to agree with me on how science and mathematics can be interwoven to answer big questions and which questions were exclusively amenable to science. Table 1 outlines the questions discussed and how we individually allocated them to one or more disciplines, whilst Figure 1 highlights the relative weighting we gave each discipline in providing an answer to the question.

	Question	Rob (Science)	Nic (Mathematics)
1	How do you know that plants photosynthesise?	Science alone	Science, informed by maths
2	How do I know you have a toothache? (Big question)	Multidisciplinary	Multidisciplinary, including maths
3	How do you know that I am in love? (Big question)	Multidisciplinary	Multidisciplinary, including maths
4	How do you know the sun will rise tomorrow?	Science alone	Maths, informed by science
5	How is the SARS-CoV-2 virus transmitted?	Science alone	Science, informed by maths
6	How do we know global warming is causing climate change? (Big question)	Multidisciplinary	Multidisciplinary, including maths

Table 1 Big questions
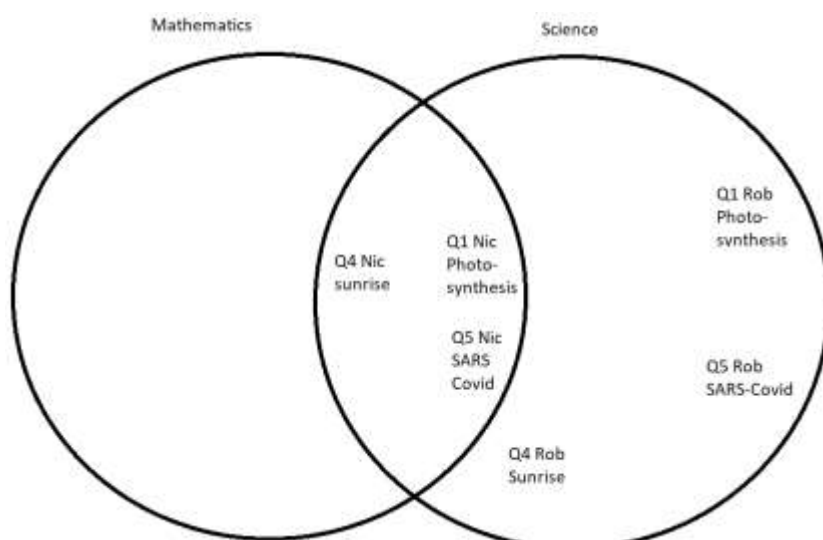
Figure 1 Positioning of responses to big questions

Realising that two teacher educators from different fields can each identify the same question as more amenable to their individual discipline, utilising the same explanation and data set, problematised my epistemic beliefs about how scientific knowledge is distinctive. Moreover, I had the troubling revelation that despite being a key member of the EI team, a multidisciplinary community of practice,

I had not previously been challenged to defend my beliefs about how scientific knowledge is constructed. I recognised that the label of the person responsible for embedding EI into a curriculum offer did not, in isolation, guarantee I had a secure understanding of how individual disciplines are distinctive. Upon reviewing available literature, I have come to realise that although there is extensive research on suggested teaching methods for secondary science (Allen, 2016; Harlen and Qualter, 2014; Nag Chowdhuri, King and Archer, 2021), and initial teacher education (ITE) for primary science specialists, (Appleton and Kindt, 2002; Hume, 2012), there is less available on how the epistemic beliefs about science frames teachers' and teacher educators' definition of the distinctive features of scientific knowledge. Given the understanding that scientific knowledge is framed by cognitive, epistemic and sociocultural foundations (Dagher and Erduran, 2014), this appears surprising, suggesting the assumptions about the distinctiveness of scientific knowledge held by science teachers and teacher educators warrants further investigation.

So what? Reframing practice and research

This cross-disciplinary and cross-phase collaboration highlighted the need to develop a common language to work together effectively (Nevin, Thousand and Villa, 2009) and the unexpected challenge of articulating disciplinary distinctiveness to someone outside of one's field. The stimulus for reviewing professional practice, whether mandated or self-directed, is often technical or cognitive discomfort (Borko, et al., 2010). Nic's early discomfort at the difficulty in constructing a satisfactory response which encapsulated how a mathematician thinks beyond habits of mind and technical practices, stemmed from a new awareness that the purpose and nature of mathematics and mathematical knowledge had not previously been considered. Furthermore, this lack of consideration had not impacted any evaluation of competence within Nic's community of practice. Rob's discomfort arose across the course of our conversations with the recognition that whilst the introduction of EI into our primary ITE provision had prompted conversations within the science team, these conversations had not forced him to articulate his definition of science as they took place with colleagues from the same disciplinary background. By expanding the Epistemic Project to include other disciplines such as mathematics, conversational spaces with teacher educators with different disciplinary expertise were opened. Conversations began to call into question our definitions of successful education and educators in our respective subject areas.

Nic's story

My difficulty articulating the epistemic distinctiveness of mathematics led me to explore different philosophies of mathematics and the consequences of those beliefs for mathematics teaching. It also led to a recognition of the disjunct between the educational aims I value and those my mathematics teaching practice has promoted.

The ambivalent relationship the UK population maintains with mathematics is not a newly discovered phenomenon (Mathematical Futures Board of the Advisory Committee on Mathematics Education, 2023; Williams, 2008). Ziegler and Loos (2017) suggest that the lack of engagement with mathematics, particularly in post-18 education, can be directly attributed to the pedagogical approaches adopted in schools. Student disengagement from mathematics (Boaler, 2002), in particular, is attributed to traditional, didactic, instrumentalist approaches. Ziegler and Loos (2017) suggest that a notable absence in mathematics education is a reflective element that considers what mathematics is, the roles it performs in society and how the subject is relevant to daily life. Advocates for critical mathematics education suggest that this reflection should go further and include a critique of mathematics in action (Skovsmose, 2010a; b; 2014; Skovsmose and Nielsen, 1996). Lack of reflection notwithstanding, the politically recognised economic importance of a numerate workforce, in particular since the publication of the Cockcroft Report in 1982 (Boylan, Adams and Birkhead, 2023), has ensured that mathematics has maintained its privileged position within school curricula and eclipsed any focus on considering the ontological and epistemic foundations of mathematics or

mathematics education. It is perhaps, therefore, unsurprising that epistemic reflexivity is not a component of teacher education or evaluation.

Nevertheless, conversations about philosophies of mathematics education provided the opportunity to uncover and challenge the implicit assumptions and ideologies (Ernest, et al., 2016) that we unconsciously champion through our teaching practices. Such conversations also allow us to imagine alternatives (Ernest, 1991). The conversations with Rob during the lecture development helped to transform my perception of competence as a mathematics teacher and teacher educator. Competency moved beyond the acquisition of deep, connected mathematical knowledge (Boylan, et al., 2023; Schoenfeld, 2020; Skemp, 1976), and beyond helping learners acquire the tools, knowledge and habits of thought which enable them to work mathematically (for example, Mason, Burton and Stacey, 2010; Mason and Johnston-Wilder, 2004). It incorporated the ability to situate mathematical learning and knowledge within wider contexts of human activity and culture (Ernest, 1991; Skovsmose, 2010b). My view of mathematics education had grown to incorporate the goal of helping students see how mathematics can be used to explain and construct reality (Skovsmose, 2010a; b). Recognising my teaching practice as consistent with descriptions of a multiplistic absolutist philosophy of mathematics (Ernest, 1991) allowed me to see how I maintained a discourse of mathematics as objective, culture-free and somehow above ethical considerations (Yasukawa, Skovsmose and Ravn, 2011), a sharp contrast to my practice when teaching in other subject areas. Whilst I continue to teach the importance of modelling structures, uncovering relationships, respecting properties, finding patterns, setting or uncovering parameters and generalising rules as the basic tools of working mathematically, these are now framed as crucial to developing an ability to understand situations from a mathematical perspective. And whilst making sense of the world mathematically requires an understanding of the principles underpinning what is accepted as mathematically true (Shulman, 1986), the question for me has become true for who and to what end? (Walkerdine, 1990)

The conversations with Rob and the subsequent self-initiated study reframed my conversations with the preservice teachers on our courses. As a result of the EI lecture, three particular themes became more frequent. First, how a burgeoning epistemic awareness of mathematical knowledge altered personal beliefs about mathematics as a subject of study. Second, a recognition of the power of understanding mathematics for creating more informed and critical citizens. Third, the nature of multidisciplinary learning and the barriers to its implementation.

The first two conversational themes, which fall within areas of interest for critical mathematics education (Skovsmose and Borba, 2004), are closely connected. Conversations made it clear that the preservice teachers' perceptions of mathematics were mostly influenced by their personal experiences as mathematics learners (Ziegler and Loos, 2017) and that they felt their professional practice was framed principally by their individual experiential filters. However, it was evident that shifts were occurring in how they worked on mathematics themselves and how they supported mathematical learning. These students are all employed as teaching assistants or unqualified teachers in primary education, so their views of what it means to be competent in doing and teaching mathematics are shaped, therefore, not only by personal, but also by professional, experiences (Lave and Wenger, 1991; Wenger, 1998). These conversations had significant implications for my practice as a teacher educator.

When imagining teaching alternatives which encouraged an epistemological consideration of mathematical knowledge (Skovsmose and Borba, 2004), I re-evaluated the experiences I provide for preservice teachers as learners, rather than teachers, of mathematics. My goal was to counteract the double discontinuity effect (Kilpatrick, 2019; Ziegler, 2010) whereby teachers, once in the classroom, revert to the, often instrumentalised, teaching style they experienced in school, rather than draw on the ways of working mathematically learned later on. In other words, somewhat counterintuitively,

to improve my practice as a teacher educator, I needed to focus as much on how I teach mathematics, as what I teach about teaching and learning mathematics. In order for my ITE students to develop their understanding and use of mathematics to become active, critical citizens (Freire, 1970 / 2017), it is not enough to work on activities or talk about how mathematics shapes our lives. I needed to maintain a constantly reflexive attitude towards how I promoted, and made space for students to prompt, dialogue in the classroom (Skovsmose and Alrø, 2002), how the language I used positions students vis-à-vis mathematics (Wagner, 2007) and how consistently mathematics was presented as a human construct (Gutstein, 2006). Only by ensuring that my teaching practices centre on enabling my students to become mathematically critical and active participants in society, can I hope to encourage similar practices in their classrooms.

The third most common theme, the nature of multi-disciplinary learning and the barriers to its implementation in particular, mirrored a point of sustained discussion with Rob around the meaning of multidisciplinarity and how primary and secondary teachers are positioned to use multi-disciplinary learning in their classrooms. Although primary teachers are trained and teach across a range of disciplines, that does not in and of itself guarantee an understanding of the unique nature of each discipline, its methods of enquiry or norms of thought (Andersson and Gullberg, 2014; Bolden and Newton, 2008). Even the frequently multi-disciplinary nature of primary teaching, using Drake and Burns (2004) definition of an interwoven range of disciplines applied to a particular theme, does not require practitioners to be aware of the epistemic foundations of knowledge in each discipline (Mård and Hill, 2020). Furthermore, even EI's recommendation of the important distinction that should be drawn between cross-disciplinary and multi-disciplinary teaching does not in itself guarantee teachers question their own epistemic beliefs.

It was the realization that, despite our experience as teachers, and previous experience using Epistemic Insight to promote multi-disciplinary thinking (Billingsley, et al., 2020), we were not as able to clearly define the distinctive features of mathematical and scientific knowledge as we had assumed which provided the source of Rob's discomfort.

Rob's story
Looking back, I now recognise that my epistemic beliefs on falsification, framed by my interrogation of research literature, were insufficient to predict the types of questions that are exclusively answerable through scientific enquiry. Research within the secondary science education community of practice largely resides within the positivist paradigm (Bianchi and Turford, 2022). As the practitioner introducing EI to colleagues, I considered my understanding of the distinctiveness of scientific knowledge to be well-established. Thus, initially, I did not interrogate the assumptions that underpin research within science education, or differences between how I labelled questions as amenable to my discipline, compared to a primary mathematics teacher educator. Consequently, my initial assumptions remained unchallenged, and I missed an opportunity to adapt my practice reflexively. Conversations with Nic were invaluable in reframing my perspective and challenging my initial epistemic assumptions. These collegial conversations across disciplinary boundaries were prerequisite to understanding that the reason I identified questions such as 'How do we know the sun will rise tomorrow?' as scientific was based upon curricular awareness of the seasons taught in the KS2 and KS3 (Department for Education, 2013b), rather than the types of knowledge required to answer that question. Until this point, my conversations about Epistemic Insight were restricted to fellow science teacher educators.

Consequently, my underlying assumptions about scientific epistemology and my resultant classification of which questions were answered by science alone remained unchallenged (Applebee, 1994; Craig, Lerner and Poe, 2008). Therefore, I anticipated a top-down process of introducing EI to colleagues in other disciplines, as the expert in the room. The realisation that colleagues outside of

my field held differing opinions on the disciplinary categorisation of questions led me back to my community of practice with queries about the security of our definition of the epistemology of science (Oborn and Dawson, 2010). In contrast to my previous experiences with EI, the joint lecture with Nic began a dialogic and dialectical process which has involved reframing the joint enterprise and terms of mutual engagement in my community of practice through a revised repertoire of language and understandings (Wenger, 1998). My emphasis on shattering subject silos in teaching (Billingsley and Hazeldine, 2020) is no longer focused on supporting preservice secondary science teachers to understand how science links to other disciplines, but rather based on a realisation that the epistemic distinctiveness of an individual discipline can only be uncovered when you interrogate the similarities and differences between disciplines and provide an opportunity to converse with experts outside of your specialism.

Although my knowledge of the science curriculum was sufficient to afford critical interrogation of its contents, it is, on reflection, evident that my community of practice was focused on debating the politics of educational policy rather than how scientific knowledge is constructed and by whom it is validated. As a result of cross-disciplinary conversations and resultant encounters with foreign competence (aka Nic) (Lave and Wenger, 1991), I have repositioned myself in relation to my science teacher educator community of practice. In my ongoing research I have begun to critically interrogate my epistemological and ontological perspectives of what science encompasses (Akerson, Cullen and Hanson, 2009; Akerson, et al., 2012), challenging my initial beliefs that science alone is based on falsification. These changes in my positionality mean I also adopt new research methodologies to examine my practice as an early career researcher and ensure the focus of my research is on myself. My research interests have shifted away from developing epistemological awareness among preservice teachers through an integrated teaching approach, instead gravitating toward my developing epistemological awareness, following inter-disciplinary conversations. In contrast to Nic, I would argue that the primary value of our multi-disciplinary conversations has been to refocus my ongoing practice as a researcher rather than a teacher educator.

Both our stories demonstrate that these conversations only came about by trying to work in a multidisciplinary way using the EI framework. The value of this experience has therefore not been about how to construct a joint lecture with a multidisciplinary focus, but rather how these conversations (which resulted from using the EI framework) allowed us to each gain a deeper epistemic understanding of our disciplinary specialisms and to realise how our assumptions or lack of critique had shaped our pedagogical practices. Our initial individual communities of practice had not offered the opportunity to have conversations like this which provoked a reframing of practice and research.

Now what? Ongoing actions
Our conversational journey has highlighted the need to incorporate a broader purpose for studying individual subjects into teacher education and later professional development. Whilst mathematics represents a 'distinctive form of *human* knowledge' (Haylock, 2024, p.20. our emphasis), it is also a tool at the service of other disciplines. The dominance of its service role in beliefs about why we study mathematics (Ziegler and Loos, 2017), combined with the invisibility of the mathematics present in our everyday lives (Gravemeijer, et al., 2017; Nunes and Bryant, 2022), has led to a narrowed conception of the curriculum, driven by task propensity (Gravemeijer, et al., 2016), and thence to growing rejection of the role mathematics can have in developing connections with other disciplines (Skovsmose, 2010b). This perception of mathematics necessarily limits the professional learning trajectories that teachers follow within their communities of practice. Both primary and secondary preservice teachers tend to demonstrate a focus on subject content knowledge during initial teacher education (Ball, 1990; Bowie, et al., 2019; Verdugo-Perona, et al., 2016). In schools, subject-based professional development is focused almost exclusively on improving children's outcomes (Borko, et

al., 2010), leading inevitably to a preponderance of technical initiatives. Our conversational journey has foregrounded an opportunity, and a responsibility, for teachers to emphasise, to learners of all ages, the power and limitations of different disciplines to explain reality.

Valuing substantive knowledge over other forms of knowing is not restricted to mathematics ITE (Davis, Debra and Julie, 2006). Within secondary science ITE, fostering opportunities to work collaboratively with preservice teachers from other disciplines would provide a platform for reflection on the epistemic beliefs on which their view of knowledge is based. Developing collaborative lectures that critically interrogate the purpose of mathematics and science as core subjects can foster valuable conversations that move beyond an instrumentalised approach and therefore reframe a community of practice as multidisciplinary (Kensington-Miller, 2018).

As teacher educators, conversations will continue with each other, with our colleagues and with preservice teachers where we seek to identify subconscious assumptions about the nature of knowledge and illuminate the epistemic foundations on which views of knowledge are based. Our stories manifest a need to return to our initial disciplinary communities of practice to challenge and critically interrogate epistemic assumptions and how these assumptions frame our practice as teacher educators. The hope is that this will influence the type of knowledge we, colleagues and preservice teachers, seek to develop through professional development. This realisation only occurred through cross-disciplinary conversations which interrogated our epistemic beliefs. Membership of a multi-disciplinary community of practice, in and of itself, may not suffice to challenge epistemic awareness.

As research practitioners, the conversation will also continue within our communities of practice. From a mathematical perspective, we believe an examination of what preservice teachers believe the purpose of mathematics to be and to uncover the voices which influence those beliefs (Ernest, et al., 2016) merits further investigation. We recognise that rehabilitating the general perception of mathematics, which has been stubbornly unappreciative in the UK for many years (Mathematical Futures Board of the Advisory Committee on Mathematics Education, 2023; Williams, 2008), is not a short-term endeavour, but the roots for this transformation undoubtedly lie in teacher education and professional development, so that a different view of mathematics is instilled from the earliest stages of school. Rob's research utilises our ongoing conversations to critically examine his beliefs about the nature of science and investigate how these beliefs frame his practice as a science teacher educator. We propose that cross-disciplinary conversations open opportunities to then examine our own practice within our disciplinary silos and the extent to which we acknowledge the multifaceted nature of our disciplines in our subject specific teaching. Consequently, our interest diverges from the initial aims of the Epistemic Insight Initiative that sought to deconstruct subject silos in the curriculum (Billingsley and Hazeldine, 2020). Instead, we used EI as a springboard to reflexively review our practice as teacher educators and recognise that even expert teacher educators' can hold limited and novice epistemic beliefs (Billingsley, et al., 2023).

Takeaways
In line with our untraditional structure, we are not presenting any findings or conclusions, but rather some points to take away for reflection. The temporal definition of a community of practice is 'sustaining enough mutual engagement in pursuing an enterprise together to share some significant learning' (Wenger, 1998, p.86). The cross-disciplinary nature of our conversations has traced a pathway through the limitations of an intra-disciplinary communities of practice approach by providing a source of external professional development. This development allows not only the formation of new cross-disciplinary communities of practice but, returning from an encounter with foreign competence prompts critical interrogation of practice.

Our conversational journey represents a trajectory through our own community of practice and has resulted in significant changes to our teaching and research interests. In the busy lives of educators, making time for conversations which are not directly about improving practice in terms of student outcomes seems an almost frivolous endeavour. However, very few conversations over the past two years have not produced some new insight. Taking part in academic cross-disciplinary discussions about the purpose or nature of a discipline is to examine the very basis of what we teach, how we teach it and why we teach it. It is to reframe the curriculum content with intentions which will traverse key stages and, more importantly, be applicable beyond school. In this respect, the EI project has offered more than it originally set out to do.

EI inspired conversations offer a counter-narrative to the instrumentalization of mathematics and science teaching by forcing recognition of the humanness of knowledge creation and application. Whilst EI asks pre and in-service teachers to consider their disciplinary knowledge, it is cross-disciplinary conversations which offer an opportunity to critique practice, to consider how to support pre-service teachers to develop criticality within their own disciplines. The learning from these conversations has the potential to outstrip the learning intended by the EI project. And yet, conversations alone will not guarantee a change in practice. It is the continual reflections prompted by those conversations which may cause an evolution of both teaching practice and research endeavours. Thus, this paper which tracks our story exposes how deliberate action to move outside existing communities of practice, and subsequent reflective writing, can transform practice and scholarly activity for teacher educators in England and beyond.

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