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## PEER REVIEW TEAM

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## WELCOME FROM THE EDITOR

Welcome to the fourth volume of the Birmingham City University (BCU) Education Journal Magazine (EJM) and the first edition of this academic year.

In this edition, we start off with an article from Caitlin Delaney, who writes about how flipped learning impacts the learning of RE for pupils in year 8, something I'm sure that could be transferred to other subjects too. Joseph Fellows then moves towards our first of three articles around physical education (PE), and writes about pre-service teachers readiness to teach PE, in relation to their engagement during their initial teacher education. Ouafa Morabit is our third article on offer, writing on the importance for enhancing students' critical thinking skills. Our fourth article in this edition is from our esteemed colleague Dr Imran Mogra, who has penned his study with Pakistani and Kashmiri students and their belief and conception regarding leadership. We then move onto Samia Shahab, who explores Teachers' Perspective of The Impact of Class Size on Teachers Workload, Classroom Practices, and Job Satisfaction in Secondary Schools in Islamabad, Pakistan. Our next article comes from one of our experienced authors for this journal, Sonali Malhotra, who has contributed an article on understanding the meaning of inclusion, specifically in a classroom setting. Our next two articles find their way to us from Northampton University. Megan Button, Sarah Cave, and Helen Tiplady present a fascinating case study on perceptions of gender in science at a rural primary school in England, whilst Simon Chapman follows on from the previous edition (Vol 3. Ed.3), with the second part of his study around how prepared Primary Pre-Service Teachers are when teaching Physical Education. This article specifically looks at what impact prior experiences of PE have on the preparedness of pre-service teachers when teaching the subject. Our final pages are dedicated to another colleague of ours, Dr Irfan Khawaja, who is delivering a course in January, aimed at supporting colleagues in educational settings with supporting learners through Ramadan in PE or physical activity.

Best wishes

Grant Huddleston

### Our aim

Our aim is to help support practice across our partnership schools and promote enquiry and research. We welcome contributions from students, teachers and academics who wish to make a positive difference to teaching and learning and believe they could help develop and support other's practice. We aim to support new and experienced writers to submit their work so that we share a variety of perspectives.

### Our goals

- Showcase the excellent work our BCU Students produce
- Allow an opportunity for those interested to publish their work to promote positive development and reflection across our partnership schools
- Promote confidence and competence to write for an education publication
- Promote interest towards research and enquiry

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You do not need to decide which chapter you wish your article to appear, but you can indicate this if you wish. Please ensure you follow the house style. Final decisions on publication are made by the editorial board. You can submit as many articles as you wish. If the editorial team have received a large number of contributions, your article may be held for later editions.

## House style

When submitting an article for consideration, please aim to follow the subsequent house style:

- Documents must be submitted in Word in font Calibri, size 11, with 1.5 line spacing.
- Include your full name and role/school – this will appear under the title.
- Any web links given should be accessible by the reader and not sit behind passwords or paywalls.
- Word count is expected to be 500 to 3000 words "all in" (including references lists).
- Acronyms and abbreviations must be written in full the first time they are used in each article; thereafter the abbreviation may be used, e.g. "The special educational needs and disability co-ordinator (SENDCO) is ..."
- UK English should be used, e.g. "...ise" endings instead of "...ize"
- Numbers one to ten written in full; thereafter numerical (e.g. 28 pupils aged nine completed... etc.)
- Double speech marks for direct speech or quotes; otherwise single speech marks
- Please use the Harvard referencing system (where applicable – we can support with this if necessary).

Please note that the editorial team will amend the final copy to suit our house style. You will receive a copy back if any major changes have been made for you to proofread.

# RESEARCH PAPERS

## ENQUIRY AND SUPPORT WITHIN THE PARTNERSHIP

### Early Career Teacher Practitioner Research: How does flipped learning impact the learning of RE for pupils in Year 8?

Caitlin Delaney - Secondary teacher of RE, King Edward VI Lordswood School for Girls

#### Introduction

Flipped learning is a methodology that has become popular in recent years. The phrase 'flipped learning' came into general use in the early mid-2000s when it was popularised by chemistry teachers Jon Bergman and Aaron Sams (Bergmann and Sams 2012) and the founder of the Khan Academy Salman Khan (TED 2011). However, the concept of flipped learning goes back much further than this. In the 1990s Harvard Professor Eric Mazur developed a model of 'peer instruction' in which he provided material for students to prepare and reflect on before class and then used class time to encourage deeper cognitive thinking via peer interaction and instructor challenge. He called this "just in time teaching" (Crouch and Mazur 2001). It aims to allow teachers to focus lesson-time on active learning as pupils have acquired knowledge about the topic before the class; usually though homework time. Essentially, what is typically completed as classwork (content based) is assigned for prior homework, with homework tasks (evaluation and/or application) is completed as classwork (Johnston, 2023). Flipped learning is especially useful for stretch and challenge as classes can focus on high-order thinking skills. In RE, this happens in the form of critical-thinking and analysis.

To evaluate the place of flipped learning in RE, my practitioner research has tested its efficacy and used pupil feedback to determine how useful it is for our students and how it can be used by teachers. As an early career teacher (ECT), I wanted to examine this pedagogy, looking at how it fits into RE in order to understand not only how it can benefit my students, but also how it could be implemented whole school for the discipline.

#### Method

To understand the ease and implementation of flipped learning, I set my high ability Year 8 class a homework task of exploring religious and non-religious beliefs about the afterlife before starting our new topic: 'Life, Death and Beyond'. We completed a lesson which focussed mostly on evaluation and analysis of the beliefs, critically considering if they were plausible explanations of life after death. The students then completed an anonymous survey about their experience with flipped learning in order to present opinions and evaluations of this pedagogy – the results follow.

#### Findings and Discussion

As shown in Figure 1 and Figure 2, as many as 87.5% of pupils agreed that the task was easy to complete and only 4.2% presenting the view that the task felt like added workload. These are positive responses for the potential of whole-school roll out as the pupil's cognitive load must be considered. The aim of the flipped learning task is to introduce content, rather than challenge, so a highly majority of pupils finding the task simple reinforces the pedagogy as being implementable.

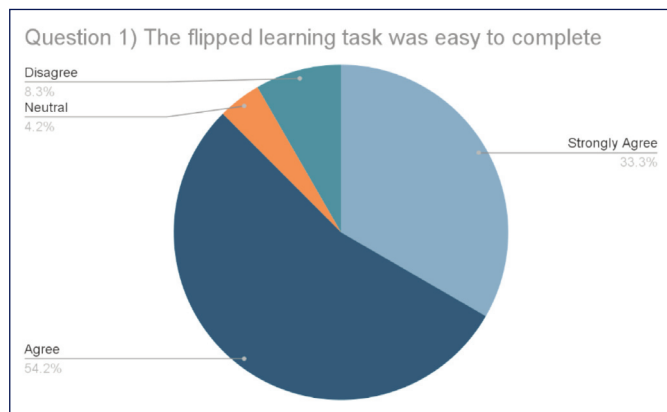


Figure 1: Students' responses to the statement "The flipped learning task was easy to complete."

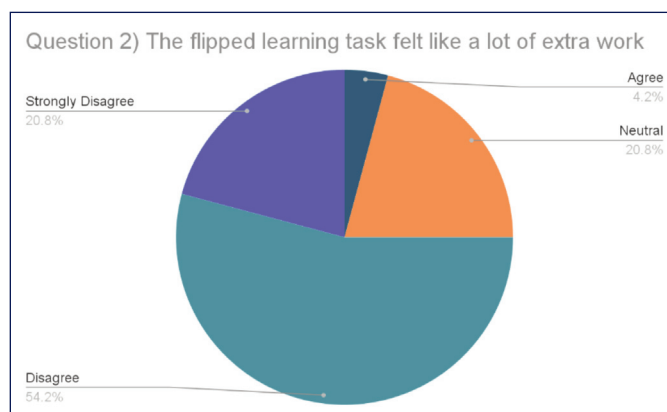


Figure 2: Students' responses to the statement "The flipped learning task felt like a lot of extra work."

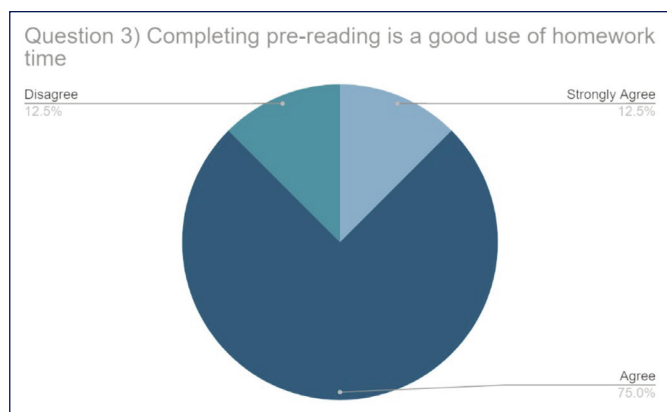


Figure 3: Students' responses to the statement "Completing pre-reading is a good use of homework time."

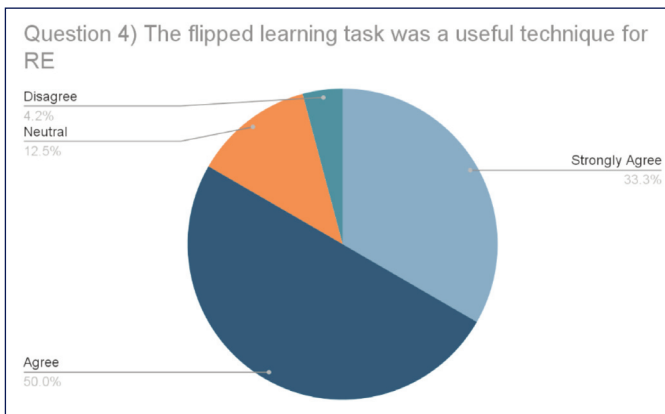


Figure 4: Students' responses to the statement "The flipped learning task was a useful technique for RE."

As show in Figure 4, 83.3% of pupils found the task to be useful, specifically in RE. This research was narrowed to focus on the subject solely so it this is a useful response that pupil can recognise the efficacy of flipped learning within RE. In order to better understand this feedback, follow up questions could be given to found out why the pupils did or did not find the pedagogy effective for RE.

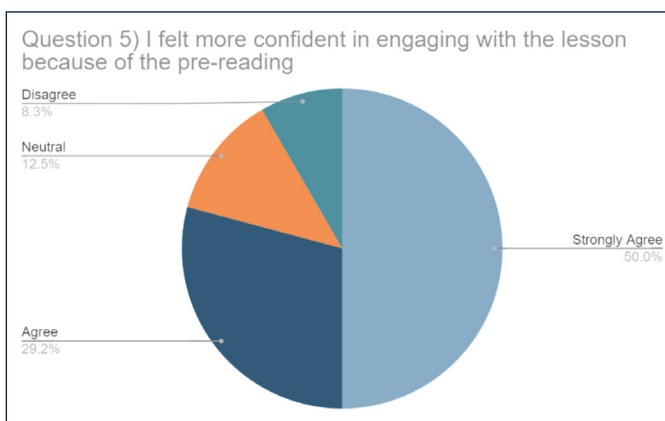


Figure 5: Students' responses to the statement "I felt more confident in engaging with the lesson because of the pre-reading"

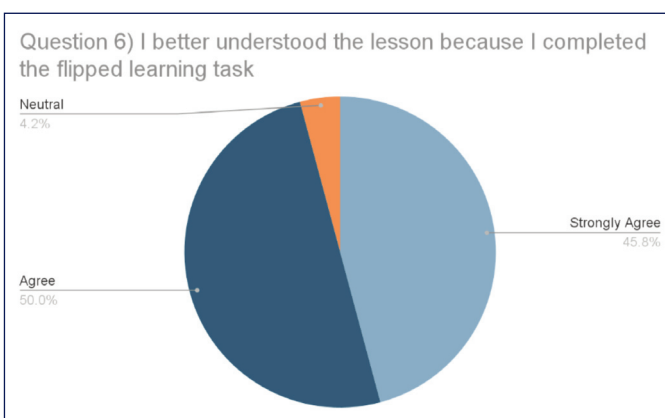


Figure 6: Students' responses to the statement "I better understood the lesson because I completed the flipped learning task."

From the above figures, the responses demonstrate a positive impact of the flipped learning with pupils demonstrating not only a high level of understanding (95.8% agree) but also a high level of confidence in engaging with more challenging content in lesson time (79.2% agree). To further test these results, I would additionally provide pupils with a fact test to verify their opinion of improved understanding.

### Conclusion

Overall, there is plenty of published evidence that suggests flipped learning is beneficial to challenging pupils in the classroom by allowing lesson time to focus on higher order skills and tasks. As an ECT, I wanted to improve my approach to high ability pupils in my teaching and as expected, I found flipped learning to allow me opportunity to focus on critical thinking during lesson time whilst still maintaining effective use of allocated homework time in line with school policy. My research has shown flipped learning to be a useful technique in RE. It was effective in practice within the lesson and the pupil forum has echoed the research.

This was a very narrow study, so it only supports the research in a limited capacity. In order to fully test the efficacy and place of flipped learning in RE, I would recreate my study in a wide capacity with a larger variety of pupils with a range of educational needs. My research is also limited in the gathering of data as pupil forums can give unreliable results with peer influence and shared answers. In conclusion, flipped learning appears to be a useful pedagogy in RE, however this conclusion needs more thorough research.

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## How does pre-service teachers' engagement in their initial teaching education impact their readiness to teach Physical Education?

Joseph Fellows - BA Primary Education QTS Graduate 2023

### Introduction

The purpose of this research is to determine the relationship between pre-service teachers (PSTs) engagement with Physical Education (PE) during their initial teacher education (ITE) and their readiness to teach the subject. Firstly, the study will explore literature on PSTs experiences of PE in ITE, specifically focusing on the sufficiency of preparation of PSTs in relation to the content and time allocated to the subject. Next, the literature review investigates PSTs experience of teaching PE during their school-based training and the impact of outsourced PE providers on the readiness of PSTs to teach PE. Finally, the literature review will examine how PSTs prior experiences in PE during their own education has impacted their ability to teach PE and views on the purpose of the subject. Furthermore, the study will outline the methods taken to obtain the data by evaluating the advantages and disadvantages of primary research, the use of online questionnaires to carry out the research. The methodology will assess the benefits of acquiring qualitative and quantitative data and what they contribute to the overall findings. Analysis will focus on the engagement of PSTs in ITE in relation to their attendance of lectures, selection of subject specialism and their readiness to teach PE. The findings will also establish a connection between how experiences of teaching PE during school-based training has impacted readiness to teach PE and how PSTs experiences of PE in their own education has influenced their engagement with the subject during ITE. Finally, the conclusions of this study will assess the findings of this study and other studies, making recommendations for future practice and policy.

### Literature review

#### What are pre-service teachers experience of PE in ITE?

Historically, PE is taught in primary schools by generalist teachers (Freak and Miller, 2017), that can lack confidence and competence in the teaching of PE, with practitioners citing their ITE experience as a contributing factor for this (Harris et al, 2012; O'Sullivan 2021; Keay and Randall, 2022). Moreover, there has been concerns that PE in ITE does not sufficiently prepare associate teachers to teach PE in their early-career, fundamentally due to the limited time that is allocated to PE in ITE (Elliot et al, 2013; Griggs, 2015; Harris et al, 2012), afforded by its low status in the curriculum (Bailey, 2018) with research demonstrating that some PSTs have had as little as 5 hours dedicated to preparing them for the teaching of PE in their ITE provision (Harris et al, 2012; Randall, 2020). Similarly, research by Elliot et al (2013) demonstrated that 45% of the participants believed that their ITE provision did not adequately prepare them to teach PE.

A consequence of the restricted time dedicated to PE in ITE has caused a significant number of PSTs to experience insufficient subject knowledge, confidence and understanding relating to frameworks and pedagogies (Tsangariodiu and Kyriakides, 2017; Freak and Miller, 2017). Subsequently, causing more criticism for PE in ITE as it is perceived that PSTs are not receiving meaningful provision (Elliot et al, 2013). Whilst the allocated time for PE in ITE is a cause for concern, providing more time for the subject does not

necessarily increase the quality of the outcomes unless the content within the course is appropriate and builds foundations for the improvement of subject knowledge, confidence, and understanding of pedagogy and frameworks (Keay and Spence, 2012; Harris et al, 2012). This is echoed by Ofsted (2022a; 2018) and the DfE (2019), underlining that high quality ITE provision ensures that PSTs receive the opportunity to develop secure, subject specific knowledge and teaching strategies including for pupils with SEND, of which they can build on from effective ITE curricula into their career.

Despite ITE educators finding obstacles in their own confidence and knowledge surrounding PE, they are tasked with deciding which content and knowledge to include in their ITE programme (Randall, 2020). Meanwhile, a key role of a teacher educator is to develop high-quality PSTs and to sufficiently prepare them for a career in teaching by implementing key knowledge that PSTs are required to know (Lawrence, 2017; Randall, 2020). It is recommended that PSTs receive training in developing content knowledge (CK) as this involves proficiency in performing skills and understanding tactics and rules (Backman and Barker, 2020; Iserbyt, Ward and Martens, 2016) required to teach in each of the 6 areas of KS2 PE (DfE, 2013a). Nevertheless, it is considered problematic for PSTs to have restricted CK, as physical demonstrations of skills and movement are vital for children's progression within PE (Kim et al, 2015; Iserbyt, Ward and Li, 2017). Moreover, Backman and Barker (2020) indicate that developing CK is crucial in building pedagogical content knowledge (PCK): a distinct combination of content and pedagogical understanding that is unique to teaching practitioners (Shulman, 1987). Subsequently, PSTs experiencing PE ITE with a combination of CK and PCK are likely to demonstrate an appropriate selection and progression of tasks based on the age and ability of their pupils (Iserbyt, Ward and Li, 2017; Ward et al, 2015).

Furthermore, in 2013 the government announced the primary PE specialist ITT postgraduate pathway, a 1-year course that comprises of 50% of time dedicated to generalist training and 50% dedicated to PE training (NCTL, 2015), in efforts to increase the number of qualified PE specialist teachers in primary schools. In advocacy for this, Lynch et al (2017) highlights that there should be more specialist PE training in primary ITE to secure a sustainable infrastructure based on understanding of holistic development and appropriate pedagogies, therefore improving the quality of PE provision. However, research indicates that PSTs on the PE specialism pathway are more likely to teach, observe and receive more opportunities in PE than generalist PSTs, causing a further knowledge gap and disadvantages to general PSTs (Randall et al, 2016), and further implying that PE ITE does not sufficiently prepare all PSTs to teach in schools (Harris et al, 2012; O'Sullivan, 2021; Randall, 2022).

#### What are pre-service teachers experiences of PE during school-based training?

In 2013, the Primary PE and Sport Premium (PPSP) – an initiative to ensure quality PE provision for children in primary schools (DfE, 2015; DfE and EFSA, 2022) was introduced as a

result of the promise of a sporting 'legacy' following the London 2012 Olympic Games (Ofsted, 2013). Overall, the aim of the PPSP is to make sustainable improvements to the quality of PE within primary education as well as increase participation of children in a variety of sports and activities (DfE, 2015; DfE and EFSA, 2022). However, a specific key indicator of improvement in the teaching of PE because of the PPSP is "Increased confidence, knowledge and skills of all staff in teaching PE and sport" (DfE and EFSA, 2022). Furthermore, the PPSP meant that funding for PE vastly exceeds funding for any other curriculum subject (Parnell et al, 2017; Randall and Griggs, 2020), which has inadvertently led to the educational privatisation of PE by opening up a market for external PE providers to lead the curriculum and work alongside generalist teachers to improve their confidence and competence in teaching PE (Smith, 2015; McEvilly, 2022; Randall, 2023). Despite this, the 'handing-over' of PE to outsourced PE providers is problematic as it has facilitated an evolving, diversifying PE workforce including sports coaches, specialist teachers, secondary PE teachers, individuals with sports related degree qualifications, and outsourced activity providers, leading to the removal of teachers altogether and unintentionally deskilling them (Powell, 2015; Jones and Green, 2017; Randall, 2020).

In justification for the employment and outsourcing of sports coaches for instance, school leaders are seeking out individuals with sporting expertise to provide CPD for practitioners and assist in meeting the DfE objectives of increasing physical activity levels in school, raise the quality of PE provision, and increase participation of children in sport (DfE, 2015; Ofsted, 2014). Consequently, this has had a counteractive impact due to the deskilling of generalist teachers in addition to the negative impact it has had on children's education, with outsourced 'specialists' missing the appropriate teaching qualifications as well as not possessing effective class management skills and pedagogical knowledge (APPG, 2019; Randall, 2020), leading to the emphasis of sporting objectives in PE rather than educational goals and experiences (Randall and Griggs, 2020; Griggs and Randall, 2019). Conversely, Ni Chroinin and O'Brien (2019) indicate that there are benefits for the employment of external providers as they are likely to demonstrate a deeper understanding as well as having increased levels of confidence in planning and delivering (DfE, 2015) PE generally, in comparison to generalist teachers.

The prominence of outsourced practitioners replacing teachers and teaching the PE curriculum causes implications for PSTs. According to the DfE (2022a), PSTs are required to spend a minimum of 120 days (24 weeks) in at least 2 primary school settings during their post-graduate or undergraduate school-based training. In addition, Ofsted (2013) and McLannan and Thompson (2015) provide guidance that children should have access to at least 2 hours of PE per week, indicating that PSTs should have sufficient opportunities to teach PE. Nevertheless, the deployment of external providers, such as sports coaches leading the curriculum, has impacted PSTs readiness to teach PE as it prohibits opportunities to plan, teach and assess in the subject, leading to a lack of confidence and competence for their future practice in teaching PE (APPG, 2019; Ofsted, 2022). Based on the findings of Randall and Griggs (2020), PSTs indicated that in only 34.8% of occurrences saw class teachers teach PE, whereas other participants highlighted that PE lessons during their school-based training were taught by sports coaches,

specialist teachers and external companies. This further demonstrates the emergence of a diversifying PE workforce and emphasises the reduction of opportunities for PSTs teachers to teach PE during their training, therefore hindering their confidence and competence.

Moreover, PSTs experiences in PE are impacted by the low status that PE holds within schools and the primary curriculum. Naturally, there is a hierarchy of subjects within the curriculum in schools and PE is considered inferior in the hierarchical order compared to subjects such as Mathematics, English and Science (Bailey 2018; McVeagh et al, 2020; Duncombe et al, 2018). This perceived low status of PE in primary schools has resulted in PE often being taught during PPA time (Randall, 2023), causing less opportunities for PSTs to teach the subject, develop confidence in their practice and rendering their ITE PE learning irrelevant (Randall and Griggs, 2020). Consequently, the opinion that PE is of low status in schools is mirrored in ITE (Randall, 2023), and causes PSTs to treat it as such.

### **What influences pre-service teachers attitudes towards teaching PE?**

Evidence suggests that PSTs do not demonstrate positive attitudes towards teaching PE as a result of their prior experiences with the subject. According to literature, the previous experience that PSTs hold in PE and sport have impacted their practice and perceptions of teaching PE (Coulter et al, 2020), creating attitudes that are often difficult to change (Tsangaridou and Kyriakides, 2017; Richards et al, 2018). Moreover, personal experiences in sport and PE have a significant influence on confidence and competence in teaching PE compared to learning in ITE provision (Elliot et al, 2013; Keay and Spence, 2012), however this is problematic as practitioners that lack confidence in teaching PE rely on their sporting experience or secondary education to compensate for this (Griggs, 2015). Relatedly, secondary school PE places a vast orientation on sport, which disregards pupils that are less skilful and generally disinterested in its competitive nature (Elliot et al, 2013; Morgan and Bourke, 2008). Whereas the purpose of primary school PE focuses on holistic development rather than sporting objectives (Randall et al, 2016; Pickup and Randall, 2022). Consequently, PSTs applying negative prior experiences from secondary education and sporting contexts to drive their approach to teaching PE results in a continued disregard for the subject and the creation of meaningless, negative experiences for pupils (Clohessy, Bowles and Ni Chroinin, 2020; Griggs and Petrie, 2017).

Furthermore, the experiences that PSTs have had in their own education, ITE provision and school-based experiences have shaped their conceptions on the purpose of PE (Keay and Randall, 2022). Due to restricted opportunities, PSTs have limited insight into the nature of teaching PE (Richards et al, 2018; Duggan, 2022). According to literature, PSTs have conflated viewpoints of PE and sport as they believe that primary PE involves the learning of sports, including developing relevant skills and techniques rather than fundamental movement skills (McEvilly, 2022; Ni Chroinin, Coulter and Smith, 2012). The prominence of this conception could relate to the National Curriculum's (2013a, p.198) aims to ensure that all children "develop competence to excel in a broad range of physical activities, are physically active for sustained periods of time, engage in competitive sports and activities and lead healthy, active lives". Whilst the DfE (2013a) indicate that

there is time available to develop skills beyond these specifications, the aims that are emphasised on ensuring children are educated in PE only provide attention to being physically active, explaining why PSTs believe that the nature of PE is primarily about learning sport (McEvilly, 2022; Ni Chroinin, Coulter and Smith, 2012). This viewpoint is challenging as reproducing the exclusivity of sport in PE causes conflict, because PE is linked with promoting values such as inclusion and diversity (Ward, 2017). Whilst learning through movement is beneficial, another advantage is that PE enables children develop holistically, by building interpersonal skills and values such as teamwork and developing children's social and emotional well-being alongside physical well-being (McVeagh et al, 2022; McEvoy et al, 2017; Pickup and Randall, 2022; Howells et al, 2017; Ofsted, 2022). Research by Freak and Miller (2017) indicated perceptions on the purpose of PE, with PSTs having their opinions categorised into: skill acquisition, healthy lifestyle, active lifestyle and child development. This highlights that there is confusion amongst PSTs about the purpose of PE, due to the variation in opinions that were given. However, Duggan (2022) demonstrates that PSTs do understand the value of PE but lack the confidence and subject knowledge required to teach the subject effectively.

### Methodology and Participants

The method of data collection for this study was through online questionnaire. The questionnaire sought to obtain a selection of both quantitative and qualitative data. This study requested the involvement of university students, specifically studying Primary and Early Years Education as a post-graduate or a 3rd year undergraduate degree. The questionnaire received 32 responses. Ethical approval was received for all participants that participated in this study, and all participants are anonymous.

Furthermore, all of the participants have completed school-based placements, in alignment with the requirements of the BA Hons Primary Education with QTS course and the PGCE Primary and Early Years Education with QTS course (DfE, 2022a). Therefore, they will have had the opportunity to observe and teach PE during their school-based experiences. As a part of these ITE courses, students are given the opportunity to select a curriculum subject to receive additional training in, providing them with essential skills, knowledge and understanding required to lead the subject in their future careers. Similarly, the questionnaire was targeted to students that are specialising in PE through the PGCE Primary and Early Years Education (Physical Education) with QTS course, where students are exposed to deeper learning surrounding PE, as well as completing more professional requirements relating to PE than their peers on the generalist courses. This signifies that some of the participants may have selected PE as their subject to gain leadership expertise or specialise in, meanwhile other participants may have selected different curriculum subjects, limiting their experience in PE ITE to the foundation modules. It is imperative that the questionnaire is directed towards students with differing experiences in PE to ensure that the results are accurate and eliminate the risk of bias in the findings. It is worth noting however, that these results are not representative of the population of PSTs due to this study having a small sample size.

## Findings and Analysis

### Engagement in PE ITE

Question 2 of the questionnaire asks participants: "Do you feel ready to teach PE?". The rationale for this question was to produce a definitive, quantitative answer, avoiding any doubt of the participants perceptions on their own readiness to teach PE.

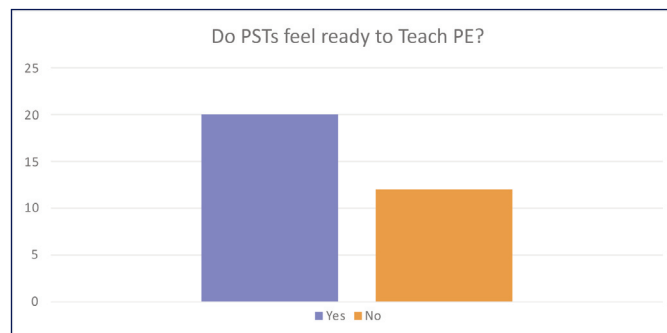


Figure 1: PSTs perceptions of their own readiness to teach PE.

Significantly, Figure 1 demonstrates that 63% (n=20) of the participants do feel ready to teach PE when they begin their career, compared to 38% (n=12) that do not feel ready to teach the subject. Whilst the majority of the participants do perceive themselves as ready to teach PE, it is vastly problematic that over a third of the participants perceive themselves as not ready. Crucially, this agrees with literature that indicates some education practitioners generally lack the confidence and competence required to teach PE (Harris et al, 2012; O'Sullivan, 2021; Key and Randall, 2022). However, the disposition that PE ITE does not adequately prepare PSTs to teach PE (Harris et al, 2012; Griggs, 2015; Elliot et al, 2013) could be challenged, due to the higher percentage of participants indicating that they are prepared to teach PE. Nevertheless, the number of participants that took part in this study is considerably lower than that of other research, therefore the argument over the ability of ITE provision to adequately prepare PSTs is unresolved due to this data.

Subsequently, participants were asked to justify why they perceived themselves as ready or not ready to teach PE. This provides a deeper understanding of what has helped or hindered PSTs preparation and perceived readiness in teaching PE.

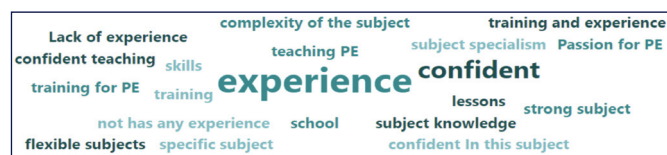


Figure 2: Word-cloud demonstrating qualitative responses.

Figure 2 illustrates the reasoning behind their perceptions of readiness to teach PE. The most common explanation of these perceptions related to the experience of PSTs, with 34% (n=11) indicating that experience has impacted their readiness.

An example of PSTs that perceive themselves as ready to teach PE stated:

- "I believe I have had adequate training and experience on placement allowing me to be ready to teach PE."
- "Wealth of experience in teaching sports."
- "I have experience teaching PE during placement."



Meanwhile, PSTs that perceive themselves as not ready expressed:

- “I have a lack of experience and subject knowledge.”
- “I do not feel confident in this subject as I do not think I have enough experience or subject knowledge.”
- “I do not feel confident as I have not had much experience in teaching PE.”

In analysis of these responses, it is clear that ITE provision does impact the readiness of PSTs. Positively, participants citing that their training has adequately prepared them, implies that PE ITE has assisted them in developing confidence and competence in teaching PE. However, many of the participants referred to their experience in sports and teaching PE during school-based training as the main contributor to ensuring their readiness to teach PE. Similarly, the PSTs that are not ready highlighted that their lack of experience in teaching PE is the reason for their level of readiness. Although, they refer to their lack of subject knowledge as a contributing factor, implying that their ITE provision has not sufficiently prepared them to teach PE. Essentially, experience in teaching PE during school-based training has more of an impact on preparing PSTs, but there is still a key role for ITE in ensuring that PSTs develop an understanding of CK and PCK.

This data compliments the research of others, as it indicates that some PSTs have limited subject knowledge, impacting their readiness to teach PE and inferring that ITE does not sufficiently prepare them (Tsangaridou and Kyriakides, 2017; Freak and Miller, 2017). Additionally, the data further demonstrates the requirement for PE ITE to balance the combination of CK and PCK because ensuring that PSTs develop knowledge on the 6 areas of PE (DfE, 2013a) along with the corresponding fundamental movement skills, tactics and rules (Backman and Barker, 2020; Iserbyt, Ward and Martens, 2016) and PCK to plan and deliver appropriate lessons and activities (Iserbyt, Ward and Li, 2017; Ward et al, 2015). Overall, ensuring that PSTs are confident and ready to teach PE effectively.

As mentioned previously, the PSTs that participated in this study had the opportunity to select PE for a subject specialism or leadership module during their course. Therefore, it is important to distinguish whether receiving more in-depth PE in ITE causes increased perceptions on readiness to teach the subject. Question 4 of the questionnaire asks participants “Did you select PE for your subject specialism or leadership modules?”. 31% (n=10) of participants did select PE for their specialism/leadership modules, meaning 69% (n=22) did not.

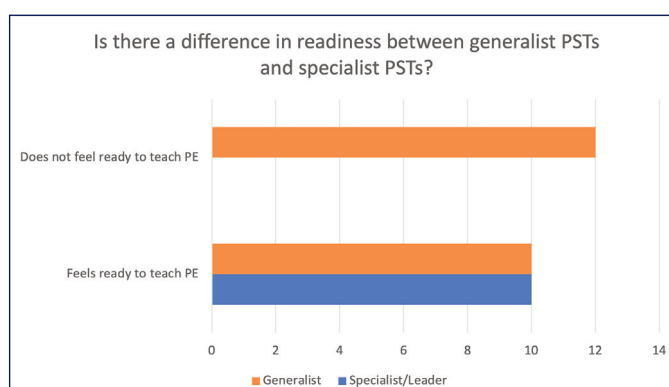


Figure 3: differences in perceived readiness between specialist and generalist PSTs.

Expectedly, Figure 3 demonstrates that there is a difference in perceived readiness to teach PE between generalist and specialist PSTs as 100% (n=10) of specialist PSTs expressed that they are ready to teach PE. Contrastingly, only 45% (n=10) of generalist PSTs rated themselves as ready, whereas 55% (n=12) perceived that they did not feel prepared. Prior research has already established that one reason for the insufficient preparation of PSTs is the diminished amount of time allocated to PE in ITE (Randall, 2020; Elliot et al, 2013; Griggs, 2015). These findings agree that time spent in PE lectures does impact preparation, as all of the participants that had access to more training and information are ready to teach PE. Conversely, over half of the participants that only had access to the statutory PE lectures in a foundation subject module perceive themselves as not ready. Similarly, this information replicates the conclusions of prior research, as it indicates that more specialist training for PE is required in ITE to improve practice and secure the future of the subject (Lynch, 2017) and that there is a vast knowledge gap between specialist and generalist PSTs, caused by additional time and opportunities given to specialists (Randall et al, 2016). This is further proven through the comments of some participants justifying their perceived level of readiness by referring to their training:

Specialist/Leader:

- “After picking PE for my subject specialism, I feel that my conceptual understanding is very strong.”
- “Having attended the general PE lectures as well as leadership modules, I feel confident in teaching PE.”
- “If it was not for choosing PE as a specialism, I feel I would struggle. But through that I have a good understanding of how to teach PE.”

Generalists:

- “PE has never been a strong subject for me, I feel I would have benefited from more in-depth training.”
- “I feel as though we need more training.”

Whilst research implies that ITE does not sufficiently prepare PSTs to teach PE (Keay and Randall, 2022; Griggs, 2015; Harris et al, 2012; Elliot et al, 2013), none of these studies discuss the connection between the level of engagement of PSTs in PE lectures and their readiness to teach PE. Therefore, it is key to explore this relationship.

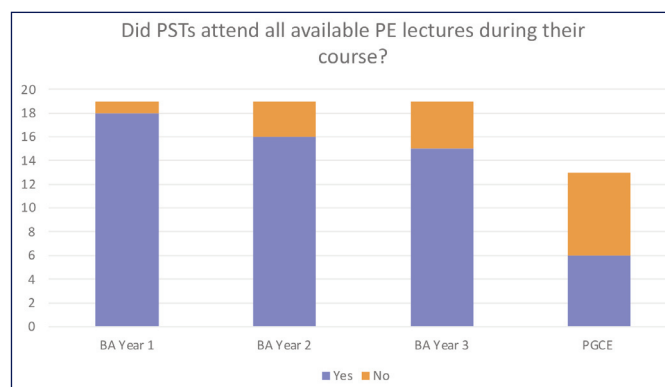


Figure 4: PSTs attendance during PE lectures.

In year 1 of their course, 94% (n=18) of PSTs attended the PE lectures, compared to 84% (n=16) in year 2 and 79% (n=15) in year 3. Whilst the level of attendance started high in year 1, it gradually decreased over the next 2 years, with more PSTs deciding not to attend. A reason for this could be that PSTs

are eager to learn at the beginning of their course, with that willingness to learn fading as the course progresses. Additionally, the decrease in attendance over the course could come as a result of the time in the year that the lecture takes place, such as after a placement or before an important deadline. Interestingly, only 46% (n=6) of PGCE PSTs decided to attend their available PE lectures, a vast difference in comparison to undergraduate PSTs. This could be due to the more intense nature of a PGCE course, with lectures taking place whilst PSTs are completing placements for instance. Overall, 63% (n=20) of all participants attended all of their available lectures, 12% (n=4) attended at least one PE lecture and 25% (n=8) did not attend any of their PE lectures.

The participants were also asked to explain the reason for their level of attendance. Some PSTs that attended all lectures demonstrated positive attitudes towards the subject and learning:

- "I am very engaged with my education and learn a lot by attending lectures."
- "PE is one of my favourite subjects and I wanted to progress in it."
- "My lack of pre-existing knowledge motivated me to attend."

Contrastingly, some PSTs that did not attend all of the lectures held negative dispositions towards learning and PE:

- "I do not like PE and I find it difficult to engage with."
- "I did not think the lectures would benefit me."
- "It is not something I am interested in compared to other subjects."

These dispositions and levels of attendance relate to research on the status of PE in education. Concerningly, a quarter of participants in this study did not attend any lectures in PE, therefore they may consider PE to be unimportant. PE has a lower hierarchical status than other subjects (Bailey, 2018; McVeagh et al, 2020; Duncombe et al, 2018) therefore it is evident that some PSTs believe that it should be lower priority in their own learning, agreeing with Randall (2023).

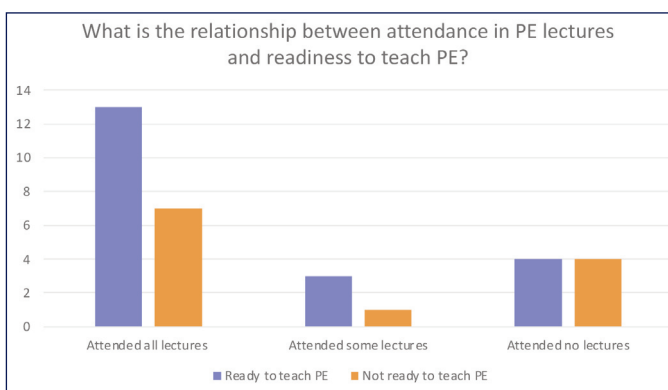


Figure 5: The correlation between readiness and engagement.

Figure 5 indicates that 65% (n=13) of participants that attended all available lectures were ready to teach PE, compared to 50% (n=4) of participants that did not attend any lectures and 75% (n=3) of participants that attended some lectures. Overall, the PSTs that attended PE lectures perceive themselves to be more ready than those that did not attend. However, there is still 35% (n=7) of participants that attended all lectures but perceive themselves as not ready, confirming that there are other factors in determining the readiness of PSTs such as

those attending all lectures being specialists and the impact of school-based training experiences with PE. The PSTs that did not attend any lectures but still perceive themselves as ready may have had sufficient positive experiences during their school-based training. Furthermore, they could hold the belief that they will not be teaching PE during their careers due to the outsourcing of PE, complimenting the findings of others (Powell, 2015; Jones and Green, 2017; Randall, 2020).

### Engagement with PE during School-Based Training

Question 16 of the questionnaire prompted participants to state if they have taught PE during any of their school-based training. In justification, this question provided quantitative results that clearly demonstrate PSTs experiences of teaching during their placements.

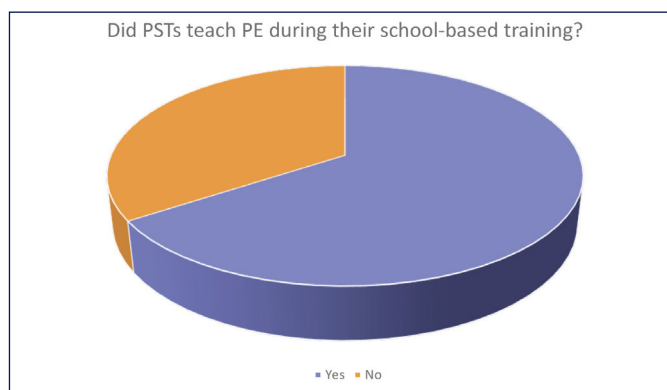


Figure 6: PSTs engagement with teaching PE.

The responses signify that 66% (n=21) of participants have taught PE during their school-based training. Nevertheless, 34% (n=11) have not taught any PE. Furthermore, 7 out of the 11 of these participants perceive themselves as not ready to teach the subject. These results are extremely alarming, as over a third of PSTs embarking on their careers have not taught PE at all during their training. This infers that PSTs have had limited opportunities to teach PE in schools, therefore supporting the literature that denotes PSTs do not receive the opportunity to teach due to outsourced providers (Randall, 2020; Powell, 2015; Jones and Green, 2017; Randall and Griggs, 2020).

Resultantly, PSTs experience substantial reduction in in their readiness to teach the subject as having the opportunity to implement learning from their ITE into practice plays a key role in preparing PSTs. Subsequently, a closed question was used to ask participants if their experience of PE during school-based training has impacted their readiness to teach it.

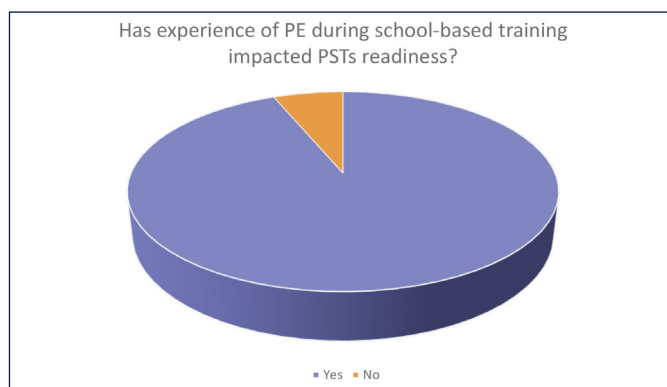


Figure 7: Impact of school-based training experiences.

The results prove that school-based experiences of PE do impact readiness, as 94% (n=30) of participants indicated that their experiences have impacted their level of readiness to teach PE.

Participants were also asked to justify why their experiences have impacted their readiness to teach PE.



Figure 8: Word-cloud showing justification of responses.

Significantly, 28% (n=9) of participants mentioned 'experience' in their response. A combination of PSTs that did teach PE and did not teach PE indicated that their experience had impacted their readiness.

PSTs that did teach PE:

- "By gaining even more experience on placement it has helped me develop in PE."
- "I feel better and ready to teach PE because of my experience."
- "Gaining hands on experience of teaching the subject has developed my confidence and efficacy."

PSTs that did not teach PE:

- "I have not had any experience, the thought of having to teach PE makes me nervous."
- "I do not have any experience, so I am not confident in teaching PE."
- "If I had taught PE I would feel more ready, but I have not had any experience."

Taking these results and rationale into account, it is clear that school-based training has a major impact on the preparation of PSTs. Complimentary to the findings of Randall and Griggs (2020), the results demonstrate that it is crucial for PSTs to implement their ITE learning into their school-based training and gain confidence and competence in planning and delivering the subject as this contributes to their overall readiness to teach PE, highlighting that a combination of experience in ITE and school-based training is vital to prepare PSTs sufficiently, rather than an emphasis on one of those aspects.

### Influences on Engagement in PE

The questionnaire encourages the participants to reflect upon their experiences of PE in their own primary and secondary education. The justification for this is to establish whether the experience that PSTs had in their education has influenced their engagement with PE during their course.

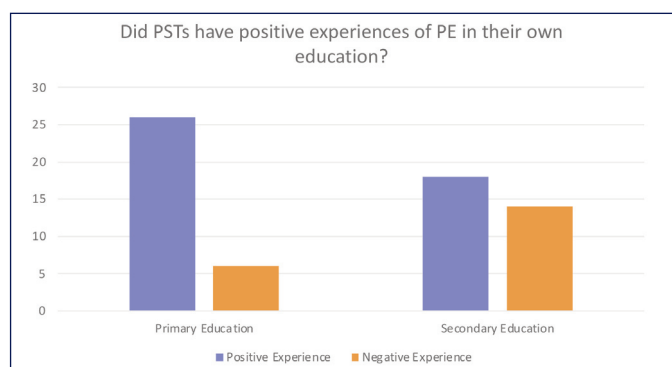


Figure 9: PSTs experience in their education.

Firstly, 81% (n=26) of participants regarded their experience of PE in primary education as positive, compared to 19% (n=6) of participants regarding it as a negative experience. Interestingly, the percentage of participants that considered their secondary education as positive was 56% (n=18), whereas 44% (n=14) considered it to be negative. Overall, 25% (n=8) had a positive experience in their primary education but a negative experience in secondary education. The reasoning for this could be due to the holistic nature of primary PE that helps children develop interpersonal skills as well as physical literacy agreeing with research (Randell et al, 2016; Pickup and Randall, 2022). Additionally, this data replicates the findings of others that maintain secondary education is exclusive towards individuals that do not enjoy competitive sports (Elliot et al, 2013; Morgan and Bourke, 2008) therefore causing a negative experience.

Subsequently, the questionnaire asks participants to reveal whether their experiences of PE in their own primary and secondary education had impacted their attendance to PE ITE lectures. Considerably, 63% (n=20) of participants emphasised that their experiences in their education did impact their attendance, where as 37% (n=12) indicated that it did not. This question facilitates the evaluation of the relationship between educational experiences and impact on attendance in ITE lectures.

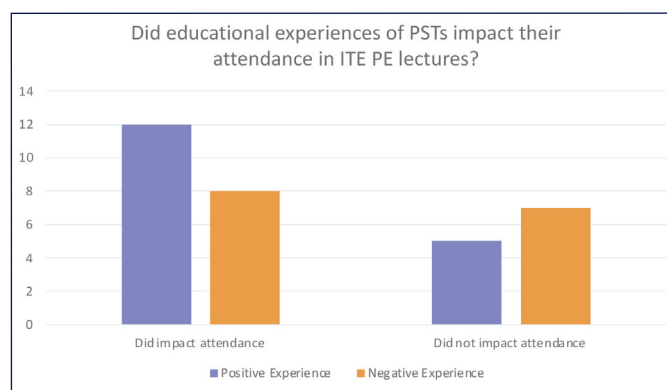


Figure 10: The impact of experience on attendance.

Figure 10 demonstrates the relationship between experiences in PSTs own education at school and their attendance in PE lectures at University. For instance, if the PST had a negative experience in their own education, is that the reason for their lack off attendance in PE lectures.

In Figure 10, 'Positive Experience' refers to PSTs that had positive experiences in both secondary and primary education. While 'Negative Experience' refers to PSTs that had a negative experience in either secondary or primary education.

When asked to justify their answers, the 12 participants that had positive experiences that impacted their attendance referred to their passion for the subject:

- "Due to me enjoying all types of sports, I have always had strong interest in PE."
- "As PE was the subject I enjoyed most at school, I believe that this has transferred into my passion to teach PE."

Conversely, the 8 participants that had a negative experience that impacted their attendance cited:

- "I thought my negative experiences would continue in university."
- "I have had bad PE experiences which has made my attitude to PE negative."

- “Not enjoying the lesson made me feel anxious to attend and want to find excuses not to partake, it felt like a chore.”

Finally, the PSTs that denoted their experiences did not impact their attendance stated that they were more concerned about their ability to teach PE, disregarding their prior experiences:

- “Lessons from the past don’t determine my willingness to make sure I have good subject knowledge to teach PE.”
- “My attending is because I want to be a good teacher not because of how I engaged with the subject in my youth.”

These results confirm that educational experiences impact attendance for the majority of PSTs. Aligning with research, previous experiences impact practice in PE and generate dispositions that are difficult to change for the majority, therefore impacting their ITE engagement with the subject (Tsangaridou and Kyriakides, 2017; Richards et al, 2018; Coulter et al, 2020). However, this study differs, as a number of PSTs understand their professional duty to develop knowledge and proficiency in PE, despite their experience of the subject.

## Conclusion

An issue that policymakers and subject leaders need to be aware of is the level of preparation that PSTs receive from their ITE provision. Research indicates that ITE for PE does not sufficiently prepare PSTs to teach PE in their teaching careers. This study agrees, as the data reveals that over a third of PSTs entering the profession do not feel ready to teach PE. Evidently, a reason for the insufficient preparation of PSTs is the lack of time that is allocated to PE in the ITE curriculum. Therefore, a recommendation to overcome this could be for the DfE to implement statutory policy that recognises the importance of teacher education in PE, by dedicating more time to the subject in ITE. This would be advantageous, as PSTs would receive more in-depth training in the subject, contributing to their overall confidence in teaching the subject and benefitting the pupils they will teach. Nevertheless, as PE is recognised as a foundation curriculum subject, this recommendation causes limitations because researchers will call for more time to be allocated to other foundation subjects as they are viewed similarly in terms of importance. Consequently, this will cause practical issues as there is not enough time to complete a higher number of lectures for each foundation subject in ITE.

Furthermore, school and subject leaders for PE must understand the fact that a third of PSTs have not taught PE at all during any of their school-based experiences. Research agrees with this, as it indicates that PSTs do not receive enough opportunities to teach PE during their school-based placements due to outsourced PE providers teaching instead. Ergo, indicating that PSTs are not ready to teach PE due to this reason. To overcome this, ITE providers must ensure that they have strong partnerships with schools, so that PSTs receive the opportunity to teach PE and schools understand the impact of their experience on readiness to teach the subject. One recommendation for subject leaders is to establish clear guidelines for the role of outsourced PE practitioners such as sports coaches. The DfE indicate that their employment is intended to help generalist teachers improve their practice, however research highlights that they are inadvertently replacing teachers. Additionally, a suggestion for subject leaders is to prepare sufficient continuous professional development (CPD) to teachers entering the profession due to the number of PSTs that have

not taught PE or attended lectures on the subject. This will facilitate more opportunities for teachers to gain skills, knowledge and understanding in planning and delivering PE lessons, subsequently ensuring children’s development in PE. Despite this, it will be difficult to engage some teachers in PE CPD, especially if they had negative experiences in their childhood and did not teach PE or engage in their ITE lectures because their attitudes are difficult to change. In order to mitigate this, subject leaders could ensure that they facilitate positive CPD experiences as well as recognise and address the reasons why individuals hold these negative opinions.

Finally, this study replicates the findings of previous research in stating that PSTs own educational experiences influence their attitude towards PE. Therefore, ITE providers must acknowledge prior experiences in PE due to its impact on practice and engagement. Considering this, ITE providers should discuss the responsibility of PE in building interpersonal skills in cohesion with physical skills, developing children holistically. It must be made explicitly clear that PE is not just about sport, it is a vital subject that helps children’s wellbeing and education. Furthermore, due to secondary education causing a higher number of negative experiences, a recommendation could be to ensure secondary PE is more inclusive and less sport-focused, allowing pupils to develop a love of movement which they can carry later on in life. In essence, if PSTs had more positive experiences in secondary PE, they would have a deeper understanding on what the true purpose of PE is and continue positive dispositions into their teaching and learning in primary education.

## Recommendations

1. DfE to implement statutory policy that recognises the importance of teacher education in PE, by dedicating more time to the subject in ITE.
2. Subject leaders is to establish clear guidelines for the role of outsourced PE practitioners such as sports coaches.
3. ITE providers should discuss the responsibility of PE in building interpersonal skills in cohesion with physical skills, developing children holistically.

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## CURRENT ENQUIRY AND PRACTICE

### The importance for enhancing students' critical thinking skills in Key Stage via mathematics education and the effective strategies that promote its growth.

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#### Introduction

The primary aim of this study is to offer a pedagogical approach that fosters the enhancement of critical thinking (CT) skills through mathematics teaching at Key Stage two (KS2). The main focus will be on fostering students' ability to examine and evaluate mathematical concepts and problems, rather than only relying on rote memorization of formulas and methods. Mathematics is a discipline that finds application in academic, vocational, and daily scenarios. The integration of critical thinking skills enables students to effectively employ mathematical principles in practical situations and effectively address intricate challenges. Moreover, the pursuit of mathematics fosters the development of logical thinking aptitude and strengthens one's capacity for effective decision-making. Criticality via mathematics education is an instructional strategy that seeks to empower students by encouraging their active engagement in constructing a society that is more equitable (Gutiérrez, 2022). Furthermore, the incorporation of criticality within mathematics education serves to empower students to overcome negative attitudes towards mathematics, develop confidence, autonomy and effectively navigate unpredictable challenges in life.

#### Literature review

##### What is critical thinking?

The concept of CT can be traced back to the time of Socrates (399–479 B.C.), who emphasised the importance of questioning and reasoning. John Dewey later coined the term "critical thinking" and proposed that education should focus on developing rational inquiry skills (Dewey, 1910). Later, the analytic philosopher Max Black (1946) supported CT and authored the first text using the word "critical thinking" as a heading. In the 1980s, CT gained more popularity, and the "Philosophy for Children" (P4C) program was developed to nurture CT in young people. Various researchers have different opinions on the characteristics of CT, but there are commonalities such as self-reflection and the ability to respond to situations. However, the most common description of critical thinking today is derived from Facione (1990), who stated that CT is an autonomous judgement conveyed by reasoning, examination, assessment, conclusion, and justification of pertinent evidence, notions, techniques, or scenarios while Paul and Elder (2007) described CT as the skill of examining and assessing thinking. Robert Ennis is a significant researcher in the field and developed tests to measure CT (Ennis & Millman, 2008). Based on Bloom's taxonomy, Thompson defined CT as a series of abilities (Thompson, 2008). Furthermore, Dwyer (2017) highlights CT as a metacognitive activity that enhances problem-solving and consensus-building in educational settings when effectively employed. Moreover, Salmon and Barrera (2021) stated that CT is the capacity to evaluate an issue from a variety of angles while minimising both time and resource waste. Although, distinct kinds of critical thinking are particular to the area or subject of the issue under consideration (Middendorf and

Shopkow 2023). Critical thinking involves critical reasoning, self-reflection, action and it is essential for making sound choices and pursuing further education.

##### The connection between critical thinking and mathematics

Research has shown that integrating CT skills into mathematics education can improve students' cognitive abilities. When students engage in mathematical problem-solving tasks, they use analytical thinking, evaluation, and logical reasoning to find solutions (Ramsay, 2022). Additionally, Dogruer and Akyuz (2020) found that incorporating argumentation in mathematics classroom setting helps develop CT skills and enhances students' understanding of maths concepts. Furthermore, mathematical reasoning involves the integration of logical and CT skills to solve problems by making connections and identifying the best solution (Clements & Sarama, 2020).

##### Language and critical thinking skills

Language is a valuable tool for thinking and learning, and its acquisition and use are influenced by social interactions (Pollard et al., 2023, p.60). Vygotsky's perspective emphasises the role of language in cognitive processes and interpersonal communication as a result, language is a fundamental instrument for critical thinking and cognitive development (Padmanabha, 2018). In the context of mathematics education, communication is crucial for a deeper understanding of mathematical concepts (Manouchehri and St. John, 2006). The cultivation of advanced mathematical reasoning depends on proficient communication. It is important to foster critical and dialectical discourse in mathematics instruction. The growth of mathematics relies on activities such as communication, problem-solving, mathematisation, and recontextualization (Isoda and Olfos, 2021). The development of cognitive and communication skills is intricately connected to the learning of mathematical reasoning (Payadnya, 2019). Teachers have the authority to design activities that require students to engage in mathematical computations and participate in mathematical discussions.

##### Teacher expertise and teaching methods

Effective instructional strategies in mathematics are crucial for fostering critical thinking skills in Key Stage 2 pupils (Lombardi, 2021). Teacher factors are predicted to influence how pupils learn regardless of their race, gender, age, or other socioeconomic variables (Nilsen et al., 2020). For instance, the post-pandemic context has increased the criticality of the teacher's role and brought to light the necessity for efficient teaching and learning strategies to maximise the utilisation of school hours (Hodgen et al., 2020). Accordingly, the use of conventional instructional approaches devoid of innovation may engender a distressing experience for most students, resulting in the development of mathematics anxiety (Evedi et al., 2022). By making maths relevant and enjoyable, educators can help alleviate students' anxiety and foster a cheerful outlook towards the subject.

### Foundational knowledge

Human cognitive processes rely on hierarchical structures for the purpose of knowledge and concept processing (Rivela et al., 2021). The cognitive process includes reception, processing, storage, and retrieval of information from memory, as described by Binder et al. (2019). Acquiring information encompasses three distinct aspects, namely declarative, procedural, and conditional knowledge, as identified by Amalina and Vidákovich (2023). Declarative knowledge is the comprehension of factual information, procedural knowledge involves the acquisition of skills to perform tasks, and conditional knowledge includes the understanding of the context and logic for the utilisation of information. The field of mathematics is characterised by a hierarchical structure, wherein the comprehension of complex concepts is conditional upon the acquisition of fundamental knowledge (Makhene, 2022). The absence of previous information in mathematics has the potential to impede the process of learning (Ganguly et al., 2022).

### Parental support

Parents' educational levels and involvement in their children's schooling can impact their mathematical achievement (Evans and Field, 2020). The insufficient parental support for students in Key Stage 2 mathematics is a growing concern. This lack of involvement from parents not only affects academic performance but also leads to emotional apathy and detachment from the subject (Smith, 2021).

### Teaching strategies

Teaching strategies that foster critical thinking development in mathematics at the Key Stage 2 level include:

- **Teacher-Pupil Relationship:** Building meaningful professional connections with students understanding their individual needs and challenges can enhance their inclusion and coping skills.
- **Assessments:** Regular formative adaptive assessments, such as quizzes and observation-based activities, can help identify learning gaps and provide feedback to guide instructional decisions.
- **Knowledge Organisers:** Revisiting mathematical vocabulary, key facts and concepts at the beginning of each session can help teachers engage in critical thinking about the content they want students to master (Smailes, N., 2018).
- **Importance of Questioning:** Encouraging discussions and using both convergent and divergent questions can enhance students' critical thinking and higher-level thinking skills.
- **Metacognition,** which is the understanding and control of cognitive processes during active participation in problem-solving tasks (Flavell, 1979). Metacognition is vital for becoming self-regulating and autonomous for pupils who engage fully in the process of educational activities (Anca, 2022). Teachers can empower students metacognitive abilities by building their autonomy and self-monitoring (Quigley et al., 2016). Hence, educators possess the capacity to cultivate this comprehension by imparting learners effective problem-solving methodologies and highlighting CT skills.
- The integration of technology in education has the potential to increase instructional methodologies such as flipped learning and the facilitation of assessment along with the feedback (Stringer et al., 2022). In addition, technology facilitates access to supplementary resources and affords chances for prolonged periods of study (Outhwaite et al., 2019). Although digital assistance has the potential to

expedite students' progress, it is incapable of substituting for deficient teaching (Organisation for Economic Cooperation and Development (OECD), 2015). However, it is crucial to effectively use technology and exercise careful supervision in its implementation.

### Methodology

I conducted qualitative research with an interpretivist approach to understand the classroom dynamics and the experiences of teachers. The goal of the research was to identify effective teaching strategies for enhancing critical thinking skills in KS2 mathematics and bridging the gap between theory and practice. I also incorporated social constructivism as a philosophical framework, emphasising the importance of social interactions and teamwork in the learning process. The input emphasises the significance of CT in KS2 mathematics instruction and the need for a critical theoretical approach to challenge existing structures and promote emancipatory education. This study followed an inductive approach to analyse the data aiming to identify prevalent themes and patterns through a comprehensive thematic analysis drawing on (Braun and Clarke, 2006). This approach help to minimize confirmation bias in the analysis process.

Ethical clearance for this research project was granted from university (June 2023) via a form that addresses the study idea and ensures confidentiality of participants (BERA, 2018). I also obtained participants' consent forms in the process. The method of selecting participants followed a non-probability sampling approach, whereby individuals were selected to satisfy certain criteria in order to get comprehensive insights pertaining to my study aims using a technique known as "purposeful expert sampling." This approach comprises recruiting participants who possess competence in KS2 mathematical teaching experience. The participants in this study consist of pre- and in-service teachers, MA colleagues teachers and university professors who instruct trainee teachers in the PGCE/QTS programmes. The selection of participants was determined by their voluntary willingness to participate, their availability, and their appropriateness for inclusion in the study. Since the participants were chosen based on the researcher's subjective judgement, the findings are prone to bias, notably "observer bias". The collection of primary data involved conducting structured interviews with open-ended questions (Winwood, 2019) through online meetings on Microsoft Teams and distributing questionnaires to participants via email. Additionally, secondary data was gathered by reviewing pertinent literature. The utilisation of these methodologies aimed to ensure an in-depth knowledge of the study questions and provided a robust dataset for the purposes of interpretation and analysis.

### Limitations

Given the constraints imposed by time, it was thought necessary to employ a cross-sectional temporal framework. My recommendation for future research could involve expanding the scope of the study by incorporating a larger sample size. Additionally, it is suggested to adopt a research strategy that integrates both qualitative and quantitative methodologies. This approach will enable a comprehensive analysis of students' critical thinking abilities. Observational methodologies and measurement tools are deemed efficacious for assessing the critical thinking proficiencies of pupils. Furthermore, the inclusion of data obtained from Key Stage 2



Statutory Attainment Tests (SATs), would enhance the depth and breadth of the study.

## Findings

The initial inquiry of the study was 'how to develop pupils' CT skills through mathematics education at the KS2?' Based on the research results pertaining to this inquiry, an effective approach to fostering critical thinking abilities among students at the KS2 level in mathematics education is the integration of real-world problem-solving tasks within the curriculum to foster CT and facilitate the application of mathematical knowledge in practical daily life contexts. Furthermore, collaborative tasks and debates that require evaluation and analysis of various viewpoints. By cultivating an educational setting that encourages the application of CT, students could cultivate a sense of self-assurance and autonomy in their mathematical learning. This pedagogical approach not only facilitates students' comprehension of the pragmatic implications of mathematics but also fosters the development of creative and critical thinking skills within a relevant framework. Through the development of CT abilities in mathematics in primary setting (KS2), educators have an opportunity to supply students with the necessary tools to effectively address intricate issues and establish correlations between mathematical principles and their practical applications. In light of the growing dependence on automated systems and technology, the capacity to engage in CT and problem-solving emerges as a highly valuable attribute. Through the cultivation of these proficiencies inside mathematics classrooms, educators could help tackle anti-maths mindset while also providing students with the necessary skills to thrive in the labour market and effectively address practical challenges. Moreover, the nurturing of CT and problem-solving abilities via mathematics fosters the learners with valuable life skills that extend other disciplines, including STEM subjects, physics, architecture, medicine, finance, computer science, business, art and beyond the confines of educational settings.

The finding of the second research question within the scope of the inquiry, 'What are the most effective pedagogical strategies to facilitate critical mathematics education at KS2?' The study suggests that effective pedagogical strategies can enhance students' CT skills in KS2 via mathematics education. The strategies involve:

- Presenting authentic mathematical problems, incorporating real-world scenarios and encouraging active participation in problem-solving exercises.
- Inquiry-based learning fosters students' ability to ask questions, explore mathematical concepts, and establish correlations among mathematical notions.
- Collaborative learning strategy promotes inclusion and active participation among students. It further enhances CT abilities by allowing students to exchange along with challenging views and approaches.
- The integration of technology into the classroom can also enhance CT skills by allowing students to investigate and evaluate real-world data, participate in virtual simulations, and tackle complex mathematical issues. Technology also provides immediate feedback, enabling students to monitor their progress and enhance their CT abilities.
- Schools can ensure teachers have the necessary resources to cultivate CT skills by offering continuous professional development (CPD) opportunities.
- Integrating CT in mathematics instruction can improve climate change education and sustainability. This involves examining information presented in data and media reports. Cultivating a critical mindset towards information from various sources is crucial. Engaging in data analysis beyond explicit content can lead to extrapolations, predictions, and inferences.

## Conclusion

The United Kingdom Government published (September, 2023) and updated (October, 2023) strategies to enhance both the capacity and quality of mathematics instruction (DfE, 2023). This includes the creation of a novel National Professional Qualification (NPQ) in mathematics, aimed at fostering the professional growth of primary school mathematics teachers. The initiation of this endeavour is planned to occur in February of the year 2024 and it is now accepting applications. Rishi Sunak, the Prime Minister, expressed the need to alter the prevailing anti-maths mindset. My motivation behind conducting this study on the significance of promoting critical thinking via mathematics education in primary schools stemmed from the observation that traditional instructional approaches are insufficient in equipping students with the necessary skills to navigate the complexities of the contemporary days. The acquisition of higher-order cognitive abilities is of utmost importance for youngsters in technology and automation era. Due to its emphasis on critical thinking and practical application of concepts, mathematics provides a distinct opportunity for the cultivation of these talents.

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## Heading for leadership: Metaphors from Pakistani and Kashmiri teachers

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### Introduction

Those entering the teaching profession transform their identity as they meander through the ebb and flow of their respective teacher education courses. How teachers imagine their future and their sense of self, in and through their course and career, is significant in understanding their conceptions, commitments and aspirations. During their course, some students from BAME communities are troubled by experiences of discrimination, whilst others flourish (Mogra, forthcoming). Thus, the setting of their course plays a fundamental role in helping them see beyond the confines of their qualification and the Early Career Teacher's (ECT) job and shape them as teachers and leaders. Research on educational leadership side-lines certain epistemological and ontological positions such as race, culture, and belief. The beliefs and values of leaders influence the ethos and visions of institutions as well as their personalities and conduct. Accordingly, their articulation of their belief and conception regarding leadership is important. This article is part of research undertaken to explore the leadership and course experiences of Pakistani and Kashmiri student teachers. It focuses on the meaning they attach to leadership and the metaphors they employ for understanding and explaining the role of leaders.

### Research method

This research offers insights from 29 BA and PGCE teachers who self-defined as being of Pakistani and Kashmiri heritage in a university in England. A questionnaire-based survey method offered several benefits. Open-ended questions were deployed to invite honest and personal comments (Cohen, Manion, and Morrison, 2018).

Participants were guaranteed anonymity, as such, pseudonyms reflecting their religious and cultural backgrounds are used. The research emphasised the opt-in nature of participating and informed consent was sought. The participant research information and consent form were provided. The research respected their autonomy and dignity (BERA, 2018).

### Leadership theories

There are several successful leadership models and practices associated with successful schools. A review by Day, Sammons, and Gorgen (2020) drew upon two main models of successful leadership: transformational and pedagogical/instructional. Transformational leadership is most often associated with vision; setting directions; restructuring and realigning the organisation; developing staff and curriculum; and involvement with the external community. They note, following Marks and Printy (2003), that these leaders motivate their followers by raising their consciousness about the importance of organisational goals and by inspiring them to transcend their self-interest for the sake of the organisation.

The pedagogical leadership emphasises the importance of establishing clear educational goals, planning the curriculum and evaluating teachers and teaching. In this model leaders emphasise the importance of teaching and learning and enhancing their quality (Day, Sammons, and Gorgen 2020). The involvement in the core business of teaching and learning

is essential for educational leaders if they are to achieve positive outcomes for their students (Robinson, Hohepa, and Lloyd, 2009). The distributed leadership is not a 'model' in itself, but rather represents both a concept and set of practices that lie implicitly within the successful application of both the transformational and instructional models of leadership (Day, Sammons, and Gorgen, 2020). The idea of distributed leadership has its origins in cognitive and social psychology, drawing particularly upon distributed cognition and activity theory.

With these summaries, Day, Sammons, and Gorgen (2020:25) emphasise that the reviews of international evidence show the work of school leaders as a critical determinant in the quality of the psychological, physical and social environments and conditions in which teaching and learning take place.

The underrepresentation of BAME teachers in leadership positions is a national issue. It appears more acute at the highest level (Mogra, forthcoming). National data reveals that in state funded schools in England, 92.5% of headteachers are white British and out of 67,576 teachers in formal leadership positions (AHT, DHT, and HT), 2.35% (1587) were leaders from Bangladeshi, Indian and Pakistani groups (DfE 2023).

### Conceptions of leadership

A section of the research explored their definition and understanding of leadership. In total 29 responses were received. There was a recognition that leadership was a complex phenomenon with divergent meanings. A group thought of it in what could be classed as transactional terms. For them, it was about being able to "give guidance" and "knowledge" and "influencing individuals". In this category, leadership was also considered to be about "decisions", and "leading a group of people or an organisation". In essence, according to this interpretation, leadership means taking responsibility to lead and direct.

However, others conceived leadership as distributed. These participants felt that it was about "taking ownership of something" and leaders were the "superiors [who are] involved as frontline workers not just as delegators". Other traits included:

"A leader leads a group of people but also takes everyone's opinions/weaknesses into consideration." (Habibah, female, UG).

"Leadership is the ability to take charge in situations in order to support others whilst also having the ability to request and make use of the ideas and thoughts of the people you are essentially leading." (Hassan, male, UG).

In other words, this group expects leaders to be involved in some of the work that those being led do rather than remaining aloof from the lower strata of the leadership hierarchy. This implies that leaders should have a close relationship by listening and learning at the same time.

A second perspective is considered in terms of being a role model. To this group, leadership also means "setting an example of how to take the next steps and outlining what is best practice and giving advice and support" (Bilal, male, PG).

At least three understood it beyond the confines of a position where a leader exerts influence (Northouse, 2016). For this group, leadership means exerting social influence on effecting change towards a common goal to improve circumstances or situations. It was defined by Maymunah and Khawlah as “being accountable for good outcomes as well as for mistakes”. According to Amra, it was a “process of guiding teachers, children and parents towards common educational goals”.

Finally, it was also appreciated as servant leadership where empathy and the development of individuals existed and was not confined to the setting of goals (Spears, 2010; Blanchard and Broadwell, 2018). Asma felt that it was about “taking charge and showing confidence in taking charge”. However, for Juwayriyah, this was to be executed without being “condescending, controlling, [and by taking] the groups’ views into account, being calm and collected”. Moreover, Sawdah compounded this perspective by adding that “leadership is when an individual listens to and takes into account the feedback of other individuals and is able to regulate situations and as well as enable individuals to become the best of themselves”.

The above findings show a sophisticated conceptualisation of leadership. Whilst the study was not concerned with uncovering the epistemological basis of these conceptions, the elucidation of leadership in terms of servitude appears to portray a religious dimension. For example, servant leadership may well have been informed by a well-known Islamic tradition: ‘The leader of a people is their servant’. Historically, servant leadership is exemplified in the workings of Jesus, Guru Nanak, Prophet Muhammad (ﷺ). This suggests that there is a need to overcome ethnocentrism and for reconceptualising educational leadership. Shah (2006) has argued that this is to be realised in ways relevant to the experiences of diverse ethnic groups, students and communities. The reception of educational leadership by learners from diverse ethnic and cultural backgrounds interacts with their learning experience and performance. Therefore, to her, any analysis of perceptions of leadership in a particular society needs to be understood and debated in context.

## Background

Another section of the inquiry asked them to present a metaphor for leadership. Metaphors may convey an apparent simplicity in their formation. However, they can signal the potential modus operandi of how these future leaders intend to lead their settings or prefer to be led by leaders. That said, most conceptions at this initial phase would be considered malleable subject to modifications through education, experience, policy and context. Metaphors such as teacher as researcher and teacher as professional are some of the common descriptions of teachers’ work (Kumashiro, 2004).

Race, religion and culture play a part in producing metaphors to portray teachers and their work. A complex web of interconnected discourses such as historical, social, political, economic and generational come into play to influence the discourse of the teacher. This is especially the case when deconstructing the metaphoric meaning of the “Black Teacher” (Brown, Dilworth, and Brown, 2018:285). The significance of understanding all teachers, but especially Black teachers through metaphors helps to illustrate the possibilities and limitations of conceptualizing the Black teacher. It also helps to capture the long-term historical work and conceptualization of the Black teacher over time. After

discussing the theoretical underpinnings of their use of metaphor to describe the work of Black teachers, (Brown, Dilworth, and Brown, 2018:285) discuss four metaphors about Black teachers: Black teacher as a commodity, Black teacher as silver bullet, Black teacher as role model and Black teacher as kin. They draw attention to the limitations and possibilities of using metaphors within the literature of Black teachers and suggest that teacher education programs draw on metaphors for preservice teachers to consider the context of inequity, the possibilities for transformation and to properly conceptualize what culturally relevant and social-justice based teaching could look like (Brown, Dilworth, and Brown 2018:296).

Metaphors are also akin to sense-making where they refer to how people structure the unknown to be able to act upon it (Schechter, Shaked, Ganon-Shilon, and Goldratt, 2018). In addition, Schechter, et al., (2018:4) note that “metaphors are a dominant component of figurative language. They reflect cognitive processes through which humans encounter the world, perceive reality, and envision change (Witherspoon & Crawford, 2014). They are mental constructs, which reflect how human beings experience and shape their reasoning (Gunbayi, 2011).” Moreover, metaphors offer colourful descriptions about teachers and teaching (Brown, Dilworth, and Brown, 2018).

Johnson (2017) notes metaphors for headteachers such as parent, ringmaster, architect, and juggler. In her study, five overarching metaphors synthesize the BAME head teachers’ leadership perspectives: parent; ambassador; moral steward; role model; and advocate (Johnson, 2017). Some semblances with these were revealed in the current research. However, this study brought to the fore others such as “bulldozer”, “lion as it is fierce”, “storyteller”, “firefighter”, “cheerleader”, “egg in a cake” and “captain”. The metaphor of leaders as carers appears absent, most likely due to the small sample size, as one tends to intimate the kind of relationship teachers have with their schools, pupils and curriculum subjects.

## Leadership through metaphor

Participants were invited to present a metaphor to characterise leadership. The use of metaphors helps teachers think about identities as leaders and dispositions of leaders. All student teachers tendered one. Overall, they reflected a wide variety. However, Ruqayyah, (UG), was unsure about what the question meant. Hence it is important to define and explain these before engaging students with such kind of work.

To give a sense of the enormity of the responsibility of school leaders, Mulayka, a female, made a connection with political leaders. “I would use a picture of the leaders around the world because it is an excellent way of presenting what leadership may look like and the responsibilities that come with it”. Similarly, Sawdah, drawing on the metaphor of a prime minister hinted at the restricted power and the need to have common interests when executing democratic leadership role.

“Leadership is being in charge but also looking at the positives and negatives of things. For example, a prime minister of a country is a leader, but they cannot do whatever they feel like. They will have to look at the positive and negative a certain situation might have on their country.”

To illustrate the hierarchical social constitution of schools, recourse is often made to geometric figures and abstract

ideas. For example, Habibah explained:

"A school is a triangle - the headteacher is at the top, the teachers in the middle and the children at the bottom."

Some participants referenced metaphors to speak about leadership as an attempt to allude to the reality of how schools and society operate. The proposition seems to highlight indirect criticism of characteristics such as being ruthless by ignoring the views of others and pursuing self-interests.

"A bulldozer because I understand the roles and responsibilities of leadership. I am aware of the salary they receive but front liners are the ones who turn the dream into reality and get paid less than the delegators" (Zaynab, PG).

In contrast, a few focussed on the themes of encouragement by referencing narrators and cheerleaders.

"The storyteller. Leadership is all about the why and how! Being able to share experiences and guiding. Stories do that, they tell you a story and explain why things happen, how they happen and what solved the problem."

"The leader is the cheerleader - tries to get most of the people he/she leads, and is positive and upbeat..."

Be that as it may, at this stage, they may not fully grasp the socio-political narrative of education and, therefore, it is important that, unlike the apparent cheerfulness of the cheerleaders they critically understand the demands placed on leaders and all teachers. Nevertheless, the metaphor of a cheerleader represents the idea that leaders ought to raise the tempo and positivity of their staff to maximise the benefits from teachers for the benefit of communities.

Metaphors can be enveloped within a variety of discourses and practices (Brown, Dilworth, and Brown 2018). A few participants seemed to be concerned about workload and the regular policy initiatives, challenges and increasing managerial demands placed upon schools. This is perhaps captured in the image of the flames and the objects of a juggler.

"A chief firefighter. He has to lead and equip his team with all the relevant skills and knowledge to battle against different situations on a daily basis." (Bilal, PG).

"One size does not fit all. Hence, adequate training, consultation and feedback should be made available. Furthermore, managers and any other personnel involved in introducing change should anticipate conflict or change and take remedial approaches where communication and relationships may falter. The idea must be to remain equipped to douse a fire rather than be reactive - 'Be preventive rather than reactive' " (Hanzalah, PG).

"The Juggler. This is a leadership metaphor that I think most leaders would relate to because they have many things to do with their day and have many hats to wear." (Amra, PG).

Nevertheless, in such a landscape, a sense of community and the fundamental role that leaders can play in creating cohesion was echoed in at least two metaphors from Fatimah and Nusaybah respectively.

"Leadership is like an egg on a cake. You need the egg to have a complete cake without it the cake will fall apart."

"Somebody who maximises the efforts of those working for them and brings people together to achieve a common goal or purpose."

The most common image constructed in this sample is linked to cultural phenomena. The metaphor of the school leader

was likened to a captain suggesting that leaders should have a clear purpose and knowledge of their team. This exemplifies that metaphors are enveloped within a variety of historically specific interests, ideas, discourses and practices (Brown, Dilworth, and Brown, 2018).

"Leadership is the captain of your football team motivating the rest of the team to play their best to win the game." (Hassan, male, BA).

"A captain on a ship, ensuring everything is running smoothly. This is because a captain has the most experience and can give advice or make changes to support people (Atiqa, female, BA).

"A captain: someone who is in charge of a group." (Jumanah, female, BA).

A distinct leadership explanation emerged from Maryam (PG), who untangled ideas of gender disparity within primary leadership, writing: "Allowing a woman to be independent and in charge of their own life".

## Conclusion

This article analysed conceptions and metaphors from a group of recently qualified teachers of Pakistani and Kashmiri heritages. The findings reveal a sophisticated understanding of leadership, its role, opportunities, and challenges. In terms of leadership models, their depictions were found to relate to distributed, role model, influence and servant leadership models.

It also uncovered some metaphors as they imagined their future roles and responsibilities. They fortified some metaphors common among teachers and highlighted political leaders, bulldozer, triangle, storyteller, egg in a cake and captain. These have been used for different purposes including to validate and indirectly criticise educational policy, praxis and discourse.

## Implications

These findings suggest that ITE programs should enhance students' conceptions and understandings of leadership and its models in primary school and engage them in the creation of metaphors:

- to raise aspirations for school leadership
- to foster professional identities
- to challenge cultural bias inadvertently transferred through metaphors
- to engender transformation in the conception and role of teachers and leaders
- to reflect on the moral purpose of their role
- to explore the pedagogy of using metaphors

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## Exploring Teachers' Perspective of The Impact of Class Size on Teachers Workload, Classroom Practices, and Job Satisfaction in Secondary Schools in Islamabad, Pakistan.

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### Introduction

The impact of class size on education in Islamabad's secondary schools is a critical concern supported by various studies. Research by Blatchford et al. (2016) and The Organization for Economic Cooperation and Development (OECD, 2019) consistently demonstrates that larger classes increase teacher workload, hinder effective instruction, and strain resources. Overcrowding leads to challenges in classroom management, reduced engagement, and limited teaching time, as highlighted by OECD (2019) and Oplatka (2019). Klem and Connell (2004) and OECD (2019) note that larger classes affect the availability and allocation of educational resources, such as textbooks and technologies, crucial for effective teaching and learning.

Moreover, studies by Blatchford (2011) and Nye (2004) indicate that larger class sizes influence teaching methods and limit individual attention, potentially resulting in a more teacher-centric approach, as observed by OECD (2019). However, Mahmood et al. (2022) pointed out the lack of specific research on teachers' perspectives regarding class size effects in Islamabad's secondary schools, highlighting the need for a focused study.

This study aims to fill this gap by exploring teachers' views from public and private schools. The goal was to contribute to educational policies and practices for optimizing classroom conditions and enhancing instructional quality, drawing from the existing body of knowledge on class size and its implications for teaching and learning.

This paper is underpinned by three fundamental research questions:

- 1 How does class size affect the teachers' workload in secondary schools in Islamabad, Pakistan?

- 2 How does class size influence classroom practices in secondary schools in Islamabad, Pakistan?
- 3 What are teachers' perceptions of class size and its impact their job satisfaction in secondary schools in Islamabad, Pakistan?

### Literature review

#### Definitions of class size

Different studies interpret classroom size in varied ways, emphasizing the need to understand the nuances within each definition. Traditionally, class size refers to the number of students within an educational setting, but discrepancies arise when considering the inclusion of teaching and support staff. Smith and Johnson (2018) focused on students enrolled in specific courses, studying the impact of student-teacher ratios on performance. They defined class size as the total number of students and manually counted them during on-site observations. Conversely, Brown et al. (2020) took a broader approach, encompassing not just students but also teaching assistants and support staff in the physical classroom. They explored how this comprehensive class size definition affected classroom management. Moreover, the ratio of students to teachers is a widely used measure in educational policy. Brown et al. (2020) utilized school-provided administrative data to gauge class size through this ratio, offering a different perspective on assessing classroom dynamics.

#### Class size thresholds in different countries

The ideal class size threshold varies widely across countries due to diverse educational systems, cultural norms, and governmental policies. Research on optimal class size is complex, influenced by instructional methods, student needs, and available resources. In the United States, class sizes

differ significantly among states and districts, with debates over whether smaller classes notably impact student learning, as suggested by Nye (2004). Finland, often praised for its small class sizes, integrates this with a focus on teacher training and a robust curriculum (Sahlberg, 2011). South Korea, facing larger classes due to high student numbers, invests heavily in teacher training for effective management (Lee and Kim, 2017).

Sweden has experimented with varied class size policies, yet studies yield mixed results regarding their impact on student outcomes (Böhlmark et al., 2015). In the United Kingdom, class sizes vary by school type, age group, and local policies, with a statutory limit set for younger children but no strict regulations for secondary schools. Developing countries face greater challenges due to limited resources, leading to larger classes and hindrances in delivering quality education, as highlighted by a The United Nations Educational, Scientific and Cultural Organization (UNESCO) study (2010). Pakistan lacks a standardized definition for ideal class size, with variations between 30 to 70 or more students based on location, institution type, and available resources. Educational institutions in developing nations grapple with resource constraints, impacting class sizes compared to developed countries.

#### **Class size and its effect on the teachers' workload**

Numerous studies delve into the impact of class size on teachers' workload and well-being, offering diverse insights. Smith and Brown (2018) discovered a moderate negative correlation between class size and teachers' workload, noting increased stress and difficulties in maintaining an optimal learning environment as class sizes grow. Johnson (2018) highlighted challenges in providing individual attention and discipline in larger classes, affecting instructional time and assessment tasks. Conversely, Anderson (2017) and Johnson and Martinez (2018) observed that smaller class sizes fostered closer teacher-student relationships, allowing for personalized instruction, improved job satisfaction, and enhanced instructional quality. On the contrary, Hargreaves and Fullan (2018) argued that larger class sizes limited access to professional development resources, hindering teachers' growth.

In Pakistan, Salfi and Saeed (2007) found a positive correlation between class size and teachers' workload, leading to increased stress and potential burnout. Nomaan et al. (2016) noted that smaller classes in Pakistan facilitated personalized attention and improved instructional strategies, enhancing student performance. Haider and Raza (2018) observed that larger classes in Pakistan hindered teacher-student connections, impacting communication and support. Additionally, Shahzad, Ali and Hussain (2018) highlighted compromised assessment processes in larger classes, affecting feedback quality and students' learning progress. These findings stress the importance of considering class size effects on teachers' workload and relationships when making educational decisions and resource allocations.

#### **Class size and its effect on classroom practices**

Research exploring the relationship between class size and classroom practices underscores its significant impact on teaching methodologies, student engagement, and overall educational quality. The complexity and contextual nature of this relationship have been highlighted (Lee and Smith, 2012). Theoretical frameworks like class size theory (Blatchford and Mortimore, 1994), Vygotsky's socio-cultural theory (Vygotsky, 1978), and strategies proposed by Johnson and Johnson (1989) shed light on how class size influences teaching strategies,

peer interaction, and cooperative learning opportunities.

Smaller class sizes enable personalized interaction, fostering personalized feedback and innovative teaching methods (Finn and Achilles, 1999; Slavin, 2017). In contrast, larger classes might lead to reliance on lectures for content delivery and the use of standardized assessments due to time constraints (Hargreaves and Hopkins, 2018; Cuseo, 2007). Managing discipline and individualized attention becomes challenging in larger settings (Johnson and White, 2019), while medium-sized classes offer flexibility and promote diverse learning environments (Blatchford et al., 2003; Barron and Barron, 2013).

Classroom management, crucial for the learning environment and student outcomes, involves teacher-student relationships and behavioural standards (Tahir et al., 2019). Smaller classes facilitate stronger teacher-student connections but may elevate workload stress (Pianta and Hamre, 2009; Cates and Alexander, 2013). Larger classes might rely more on whole-group management strategies, potentially reducing individual attention and student engagement (Johnson et al., 2000). In Pakistan, overcrowded classrooms have been linked to disruptive behaviour, reduced teacher-student interaction, and heightened stress among teachers (Akhtar et al., 2017; Arshad and Ullah, 2022).

These findings underscore the significance of class size in shaping teaching methodologies, student engagement, and classroom management, highlighting the need for consideration in educational planning and policy making.

#### **Class Size and its effect on Teachers' Job Satisfaction**

The impact of classroom size on teachers' job satisfaction has been a focus of extensive research, stemming from concerns about overcrowded classrooms (Ehrenberg et al., 2001). The Demand-Control-Support model by Karasek and Theorell (1990) has been utilized to understand how classroom size influences job satisfaction by examining workplace demands and resources. Quantitative studies by Smith and Johnson (2005) and Brown et al. (2010) indicated a negative correlation between larger class sizes and teachers' job satisfaction, but critics like Lee and Smith (2012) argue these studies oversimplify the issue by not considering various confounding variables.

Meta-analyses by Smith and White (2019) and longitudinal studies by Johnson et al. (2020) support a modest negative correlation between class size and teachers' job satisfaction, linking larger classes to increased stress and decreased satisfaction. However, experience, school resources, and support play significant roles. Hargreaves and Hopkins (2018) found experienced teachers less affected by class size, while Lee and Park (2019) noted better-equipped schools with resources handled larger classes more effectively, positively impacting teacher satisfaction. Class size not only affects job satisfaction but also influences access to professional development opportunities (Malik et al., 2020). Larger classes may limit resources and time for teacher training, impacting job satisfaction and career growth. Moreover, Akhtar (2013) highlighted that larger class sizes might increase administrative control, reducing teachers' autonomy and leading to dissatisfaction. Insufficient resources and infrastructure in larger classrooms, as noted by Hanif et al. (2017), also impact effective teaching and create challenging work environments for teachers, affecting their job satisfaction.

These studies collectively emphasize the nuanced relationship between classroom size and teachers' job satisfaction, underscoring the role of experience, resources, professional development, autonomy, and infrastructure in shaping educators' contentment in their roles.

### Identifying the Research Gaps

The impact of class size on teachers' workload and their perspectives remains a critical aspect influencing education quality. While existing research often focuses on Western educational systems, there's a dearth of recent studies addressing the unique challenges faced by secondary school teachers in Islamabad, Pakistan. As student enrolment grows, understanding the effects of class size on teacher burden becomes essential (Darling-Hammond, 1990).

Specific research into Islamabad's secondary schools is lacking, necessitating targeted interventions for this context. Study by Mahmood et al. (2022) highlighted infrastructure and governance improvements for primary schools in Lahore but raises questions about similar patterns in Islamabad's secondary schools. Direct feedback from teachers, as emphasized by Chughati and Perveen (2013), can enhance research comprehensiveness, shedding light on how class size impacts workload and job satisfaction in Islamabad's secondary schools.

Moreover, the lack of comparative analysis between public and private schools in Islamabad poses a significant research gap. Studies like Jumani and Shah's (2015), focusing solely on teaching methods and student outcomes in private schools, overlook comparative insights with public schools in the same area.

This research aims to fill these gaps by exploring the specific challenges faced by secondary school teachers in Islamabad, considering the impact of class size on workload and job satisfaction across public and private sectors, ultimately contributing to a more comprehensive understanding of these critical issues.

The research aims to scrutinize the impact of class sizes on teaching practices in Islamabad's secondary schools. It intends to delve into how class size influence teachers' workload, classroom practices, and job satisfaction. Drawing from prior established research, the study delved into the link between class sizes and teachers' time constraints, especially in resource-constrained contexts like Pakistan (Darling-Hammond, 2000; Rehmani, 2006). The study aligns with a positivist research paradigm, emphasizing an objective, empirical analysis of the data. This paradigm utilizes quantifiable data and statistical analyses to comprehend social phenomena (Grix, 2010). Hussain et al. (2013) emphasize the positivist stance, advocating the scientific study of social phenomena despite the role of ideational factors. Overall, the research design employs a quantitative approach and a positivist paradigm to comprehensively investigate the impact of class size on teaching practices in Islamabad's secondary schools.

## Methodology

### Research Method

Prior research on exploring teachers' perceptions about class sizes and their impact on teaching in Islamabad's secondary schools suggests employing questionnaires as a suitable data collection instrument. Therefore, this research study utilised a quantitative approach, employing a questionnaire in order to

collect data, aligning with a positivist paradigm. This method was substantiated by prior studies highlighting the impact of class size on teachers' workload, where quantitative assessments show reduced stress with smaller classes (Blatchford, Goldstein, and Martin, 2003). This was selected as quantitative approaches help gauge the correlation between class size and instructional resources (Chingos and Whitehurst, 2011). The questionnaire was structured to yield numerical data using relative frequencies, facilitating an empirical understanding of teachers' perceptions regarding class size and its impact on workload and classroom practices. This aligns with studies emphasizing the benefits of quantitative analysis in assessing the effects of class size (Chetty et al., 2014).

### Data collection

The sampling method used in this study involved both random selection and purposive sampling. Random selection ensured representative samples, enhancing external validity (Miller and Salkind, 2002), whilst in contrast, purposive sampling offered a contextual depth and diverse perspective (Creswell and Clarke, 2017). Employing both methods, the study randomly selected four schools from each public and private sector in Islamabad. Whilst aiming to include eight to ten teachers per school, we eventually enrolled 44 participants to take part in this study. The inclusion criteria encompassed experienced secondary school teachers in Islamabad, allowing varied insights. The recruitment plan, executed through school gatekeepers, aimed to solicit voluntary responses, ensuring representation from both public and private schools. This approach aligns with established research practices and allows for a nuanced understanding of class size effects on teaching practices, workload, and job satisfaction in Islamabad's secondary schools.

The statistical data analysis that was used involved frequencies and percentages to identify patterns. The research was granted ethical clearance and was conducted with a high level of competence and adhered to ethical standards established by Birmingham City University, including informed consent, privacy protection, and fairness, are emphasized to ensure participants' rights and well-being. Continuous adherence to ethical guidelines, regular monitoring and approval by the university's ethical committee were paramount throughout the research process. The process of analysing the data collected in this study will serve as a foundational element, shaping and framing the entire project. These findings serve as a framework upon which the entire research study is built (Braun and Clarke, 2013; Johnson and Christensen, 2017; Creswell and Creswell, 2017; Miller and Salkind, 2002).

## Data analysis

### Result from responses

The research scrutinizes the impact of class size on teachers in Islamabad's secondary schools. The demographic breakdown from the questionnaire responses reveals a nearly equal split between female (52.3%) and male (47.7%) respondents, primarily comprising younger teachers (50% aged 20–30). Most teachers have one to ten years of experience (majority), with 75% from private schools and 70.5% teaching compulsory subjects. Academic qualifications include 45.5% post-graduate and 29.5% graduate degrees, while 31.8% lack professional teaching qualifications.

Regarding class size, findings indicate that larger classes (31–40 students and above) lead to increased workload, a



sentiment strongly agreed upon by teachers. Managing larger classes is perceived as challenging, impacting instructional practices. However, opinions differ regarding managing student behaviour in relation to class size. Concerning teaching methodologies, a significant portion of around 75% favours group work and collaborative learning. Smaller class sizes are seen as conducive to effective classroom management, while some teachers don't believe class size affects their teaching methods or resource availability.

In terms of job satisfaction, a majority (59.1%) note that class size challenges affect their satisfaction, citing stress and difficulties in managing larger classes. Most teachers perceive considerable support from school management regarding class size issues.

In summary, the research highlights the influence of class size on teacher workload, teaching methods, and job satisfaction in Islamabad's secondary schools, underscoring the multifaceted nature of this relationship (Braun and Clarke, 2013; Johnson and Christensen, 2017; Creswell and Creswell, 2017).

## Discussion

The study delves into the impact of classroom sizes on teaching practices and job satisfaction among secondary school teachers in Islamabad, Pakistan. The demographic profile of participants provides crucial context for understanding their perspectives on class sizes. Notably, the study reflects a balanced gender distribution which aligns with the research that has shown that gender can influence teaching styles and classroom dynamics (Harris et al., 2013). Literature suggests that younger teachers may be more open to adopting innovative teaching practices (Ingersoll and Strong, 2011) that was also observed in data analysis which shows predominantly younger and mid-career educators, and a significant representation from private schools (Blatchford et al., 2015).

Regarding teaching practices, findings align with literature emphasizing the effectiveness of group work and collaborative learning in engaging students (Johnson and Johnson, 1989). While lectures remain efficient for content delivery, individual projects are also preferred, showcasing the feasibility of personalized tasks (Pane et al., 2015). Teachers perceive smaller class sizes positively influencing classroom management, consistent with research demonstrating better control and effective teaching strategies in smaller classes (Lee and Smith, 2012). Larger classes present challenges in maintaining discipline and providing individual attention (Johnson and White, 2019; Khan et al., 2017), impacting teachers' enthusiasm and choice of instructional practices.

Experienced teachers might mitigate class size impact on management strategies (Hargreaves and Hopkins, 2018), but there's uncertainty regarding its direct impact on teaching methodologies, acknowledging the complexity and context-dependency of this relationship (Lee and Smith, 2012). The analysis also suggests a mixed perspective on whether class sizes directly limit instructional resource availability (Lee and Park, 2019; Malik, 2020). Anecdotal experiences highlight challenges in conducting practical work with limited resources in overcrowded classes, emphasizing the strain larger class sizes place on instructional approaches (Author's own experience).

Regarding job satisfaction, teachers in the study expressed varying perspectives. While some reported challenges in larger classes, citing reduced attention and increased stress (Malik et al., 2020; Smith and White, 2019), others remained

neutral about the direct link between class size and job satisfaction, indicating the complexity of this relationship (Lee and Smith, 2012).

The role of school management support emerged as crucial, with positive views aligning with research suggesting that adequate resources and administrative backing alleviate challenges associated with larger classes, positively impacting job satisfaction (Lee and Park, 2019).

In summary, the analysis underscores the impact of class size on teaching practices and job satisfaction among secondary school teachers in Islamabad. It emphasizes the need for tailored support and further research to comprehensively address the intricate relationship between class size, workload, teaching practices, and job satisfaction.

## Conclusion

The study conducted in Islamabad, Pakistan, delved into the impact of class size on teachers' workload, classroom practices, and job satisfaction. It found a strong correlation between larger class sizes and increased workload for secondary school teachers. This strain affects their ability to provide personalized attention and quality instruction, leading to a shift towards more traditional teaching methods. Teachers highlighted the link between class size and job satisfaction, noting that smaller classes allowed for stronger connections with students and a better learning environment. However, this relationship is complex and influenced by various factors, including teacher experience, support from school management, and resource allocation.

The study emphasized the need for a comprehensive approach to address class size issues in Islamabad's secondary schools. Suggestions included policy changes to regulate class sizes, teacher training programs to equip educators with necessary skills, resource allocation prioritizing smaller class sizes, and supportive school leadership. Additionally, the study highlighted a misconception among participants who perceived class size as the physical dimensions of the classroom, underscoring the need to address both larger classes and smaller classroom dimensions.

Implementing these recommendations could significantly improve the educational experience for both teachers and students in Islamabad, fostering better learning outcomes and enhancing the overall educational community. This approach, coupled with ongoing research and a commitment to positive change, holds the potential to create a brighter future for education in the region.

## Recommendations

Presented below are the actionable recommendations for addressing class size challenges in Islamabad's Secondary Schools:

- Establish maximum class size limits to 30 students per class to balance teacher workload and ensure individualized attention for students.
- Provide financial incentives for schools maintaining smaller class sizes.
- Invest in specialized training programs focusing on effective classroom management strategies for larger class sizes.
- Emphasize pedagogical adaptability to accommodate diverse class sizes and student needs.
- Equitably allocate resources to support teachers handling larger classes, including instructional materials, technology, and support staff.

- Encourage technology integration to enhance learning experiences in larger classrooms.
- Cultivate a collaborative culture among school leaders and teachers to aid in managing larger classes.
- Offer ongoing professional development and involve teachers in decision-making processes related to classroom management.

These recommendations serve as a comprehensive roadmap for policymakers, institutions, and stakeholders aiming to tackle class size variation in Islamabad's secondary schools, aiming to enhance the educational experience for both teachers and students.

### Further research

I would recommend that further research efforts should be directed toward comprehensively understanding the nuanced challenges confronted by teachers handling larger class sizes in Islamabad. This initiative aims to delve deeper into the specific obstacles faced in these settings, offering insights into the intricacies of managing substantial student numbers while maintaining quality education. Additionally, exploring innovative solutions and best practices from diverse regions can enrich the strategies aimed at effectively mitigating class size challenges. By drawing upon successful methodologies implemented elsewhere, this research can illuminate novel approaches tailored to Islamabad's context, potentially revolutionizing how larger class sizes are managed while ensuring an optimal learning environment for students and reducing the burden on educators.

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## Nurturing Diversity: A Critical Analysis of Inclusive Education in Early Childhood

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### Introduction

This article presents a critical exploration of inclusive education in India's pre-primary sector. This essay delves into the nuanced challenges and evolving methodologies in creating inclusive environments for children aged 3 to 6, drawing on Petriwskyj's (2010) insights on the complexities of inclusion in educational settings. India's journey towards inclusion in education, from ancient Gurukul systems to modern pedagogical models, has been met with challenges, particularly in implementation. Roberts & Simpson (2016) highlight how educators' attitudes and skills impact the effective adoption of inclusive practices. Dr Carol Dweck's research on the "growth mindset" (Dweck, 2006) offers valuable insights into fostering resilience and potential in young learners, crucial in inclusive education. Rani (2018) articulates a vision of inclusive education where each child, regardless of abilities or background, receives a nurturing educational experience. This paradigm shift calls for a curriculum that accommodates all children, encouraging participation in a range of activities and fostering a sense of community and cooperation.

### Defining Inclusion in Educational Practice

The global evolution of inclusive education is marked by significant shifts in curriculum and pedagogy. Xing (2016)

notes the transformation in educational theory, with Bobbitt's emphasis on the curriculum's role in education. Seals (2018) and Vaughn (2013) discuss the importance of adaptable teaching methods developed collaboratively rather than being pre-planned. The adoption of the United Nations Convention on the Rights of Persons with Disabilities (2006) and the Salamanca Statement (UNESCO, 1994), as pointed out by Strogilos (2018), signifies a worldwide commitment to inclusion. Inclusion in education, as Nieto (2012) suggests, is about more than just physical integration; it is about the active engagement of all children in shared activities, fostering an environment of acceptance and equality. In such settings, students receive comprehensive support, affirming their individual identities and learning preferences. The latter part of the 20th century saw transformative teaching methodologies, heavily influenced by Montessori and Vygotsky, who advocated for individualized learning and the importance of social interaction in education. Bubb et al. (2019) highlight how successful global education systems have adopted inclusive approaches while maintaining a degree of school autonomy. The IDEA (1975) in the United States and subsequent educational initiatives in India (Jameel, 2011; Chopra and Tripathi, 2020) illustrate significant legislative progress towards inclusive education. The global shift towards more empathetic language in educational settings reflects a broader societal change towards inclusivity.

## Strategies for Implementing Inclusion

Tomlinson et al. (2003) emphasize the importance of differentiated instruction in catering to diverse student needs. Ainscow (2016b) and Huberman (1993) suggest that inclusion requires a readiness for change and collaboration among all educational stakeholders. This approach is crucial in developing effective inclusion strategies that consider each child's unique developmental areas and cultural influences. The establishment of resource rooms and the role of Special Education teachers, as described by Copland (2003), are vital in providing tailored support to students with diverse needs. These specialized environments and personnel are instrumental in creating an inclusive learning atmosphere. Effective collaboration and communication strategies, as outlined by Paulsrud and Nilholm (2020), are essential for the success of inclusive education. The implementation of digital feedback platforms (Tucker, 2020; Cowan & Flewitt, 2021) represents an innovative approach to accommodating diverse learning styles and enhancing teacher-student relationships.

## Classroom Strategies and Individualized Education Plans

Classroom strategies maybe aligned with the principles of Universal Design for Learning (UDL), accommodating diverse learning styles and needs. The Individualized Education Plan (IEP) is a critical tool in this process, necessitating a collaborative approach among educators, parents, and specialists (Spiel, Evans, & Langberg, 2014; Bachrach, 2016; Steele et al., 2021). Universal Design for Learning (UDL) The Universal Design for Learning (UDL) framework provides various platforms for interaction, expression, and representation, accommodating diverse learning styles, aptitudes, and backgrounds acknowledge Molbaek and Hedegaard-Srensen (2023). Assistive technologies enable children with special needs to engage fully in the classroom and reach their full potential. However, these interventions are thought to be most effective when educators maintain a positive outlook advise Piticari (2023).

In a mixed-ability classroom, diverse student needs coexist. Special education teachers referred to as The SpEd teacher, or Counsellor often are seen utilizing their expertise, that determines which resources would best serve the collective and individual needs of the students. They factor in the predominant learning styles, specific challenges students face, and the curriculum goals. Frequent assessments, feedback from mainstream educators, and insights from parents or caregivers further inform their decisions, ensuring that the chosen resources truly align with students' requirements. Collaboration with support services, including special education professionals and therapists, ensures that students receive the required support and accommodations for their academic and social well-being. Collaboration, while crucial, can present challenges in inclusive education. It is not exactly advised how instructors and special needs personnel should best collaborate to create more inclusive classrooms observe Paulsrud and Nilholm (2020) however it is important for each teacher or school to design their work and own personal processes.

More importantly forming strong partnerships benefits of the child who needs support. Collaborative efforts between teachers, support personnel, and specialists create an inclusive classroom environment. Here are some strategies to address collaboration challenges:

- 1 Encourage educators and support staff to undergo interdisciplinary training. This helps them understand each other's roles and responsibilities better, leading to more effective collaboration.
- 2 Establish regular meetings and open channels of communication among teachers, special education professionals, therapists, and other relevant stakeholders. These meetings can facilitate the exchange of ideas, strategies, and progress updates.
- 3 Develop individualized support plans for students with disabilities or unique needs. These plans can serve as a collaborative roadmap, outlining specific goals, interventions, and responsibilities for each team member.
- 4 Equip educators with conflict resolution strategies to address disagreements or misunderstandings that may arise during collaboration. A shared understanding of conflict resolution can maintain a positive working atmosphere.
- 5 Organize team-building activities and workshops to foster stronger working relationships among educators and support staff. Building trust and rapport can lead to more effective collaboration. We must remember that effective collaboration is not one-size-fits-all and may vary based on the specific needs of students and the dynamics within each educational setting. Feedback Mechanisms To foster inclusivity, training for teachers and feedback mechanisms are essential.

## One example of the impact of feedback mechanisms on inclusion is given below

Case Study 1: Digital Feedback Platforms: A high school uses digital platforms for feedback, allowing teachers to provide audio and video-based feedback to students. This approach not only engages students in a more dynamic way but also accommodates diverse learning styles, aligning with the principles of Universal Design for Learning (UDL). Tucker (2020) suggests that feedback need not always be written and offers audio and video-based feedback as an alternative.

Observation and feedback, traditionally paper-based, are gradually shifting to digital formats maintain Cowan and Flewitt (2021). In an inclusive preschool, educators establish a strong parent-teacher feedback loop. This communication channel enables parents to share insights about their child's needs and progress, helping educators tailor their approaches to better accommodate individual students. Henderson and Phillips (2015) believe that if carried out well, these feedback strategies can work well towards strengthening the connection that teachers have with their students. In conclusion, William (2016) highlights the importance of feedback in its most basic form, which aids students in understanding the material being taught, and claims that ongoing feedback is essential for learning progress. The resources are crucial even for a classroom set up. The teachers have to also work with an Individualised education Plan. An example Classroom Setup might be: Display a visual schedule. Fidget toys and constructive play tools to be accessible. Design self-monitoring checklists and clearly communicate expectations. Use graphic organizers. Use limited words and focus on key phrases to aid in memory retention. The use of visuals, especially in a spatial format, can significantly aid comprehension and recall. Limit distracting elements.

Apply the 'boredom index formula' is a further possible approach. This begins by gauging the attention span of students,

using the formula: Age of the student minus two = number of minutes of retention. For instance, an 8-year-old would have an attention span of approximately 6 minutes. This can guide lesson planning, ensuring that activities or segments of instruction are broken down into manageable chunks.

Scheduling regular breaks is part of this approach. Variety Stations for Engagement is a further strategy: Drawing, listening, puzzle, and computer game stations offer art, audiobooks, calming music, cognitive challenges, and interactive games respectively; each with a timer for time management. Additional Support Tools which might be used include noise-cancelling headphones for focused work. Feedback mechanisms might embody the following: Thumbs Up/Down and Fist-to-Five. Reward charts to track positive behaviour and maintain routines.

The Individualized Education Plan (IEP) is a structured roadmap designed to meet the unique educational needs of a child. Successfully implementing and following an IEP requires collaboration between parents, teachers, and special educators. An IEP ensures that children with thrive in school and achieve their full potential. It includes accommodations and modifications, which change how and what they learn, respectively. The main qualification for a student to be placed onto an IEP is that the child must have one or more qualifying disabilities. These disabilities must negatively affect a students' educational performance. For example, a few disabilities that fall under this category are autism, emotional disturbance, visual impairment, deafness, speech or language impairment, and attention deficit disorder (ADHD) state Spiel, Evans, & Langberg (2014). According to Bachrach (2016) there are eight components to how an IEP is structured for the student: current skill level, annual goals, progress tracking, special education services, duration of services, participation in mainstream classrooms, testing adaptations, and transitional goals and services. Each of these is important in figuring out where the student is on the learning spectrum and what needs to be adjusted to further improve their learning. Bachrach (2016) also highlight parents' role in students' education is the key role in the education process. They are required members of the IEP team, and their input needs to be taken into consideration within the development of the IEP. According to Steele et al. (2021) IEPs are covered under the Individuals with Disabilities Education Improvement Act (IDEA). When the team gets together for their yearly evaluation for the studentship. this is when they go over the goals the student has achieved and what next goals are set into place.

## Conclusion

In conclusion, inclusive education in early childhood necessitates a multifaceted approach, combining strategic planning, empathetic teaching practices, and collaborative efforts. By embracing these principles, educators can create environments where every child is valued and empowered, fostering a society that is not only diverse but truly inclusive.

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## INDIVIDUAL ENQUIRY AND SCHOLARSHIP

### “Scientists can be women” – A case study on perceptions of gender in science at a rural primary school in England

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#### Introduction

Science has been found to be a male dominated discipline and their success in this area is consistently exhibited (Miller *et al.*, 2018, p.1953). This may deter girls from considering jobs in science-related roles as they do not deem them gender appropriate professions, leading to disengagement from the discipline as a whole and so conforming to the negative gender stereotype (Davenport and Shimwell, 2019, p.29; Stenson, 2020, p.15). Thus, educational experiences can have major implications on future career choices, particularly in terms of girls entering science-based professions (Lumby and Coleman, 2016, p.7; Davenport and Shimwell, 2019, p.29). Therefore, the aim of this case study was to examine perceptions of gender in science from the viewpoint of both primary school teachers and Key Stage 2 children as well as to identify strategies to promote equality and challenge science-related gender stereotypes in primary science lessons. Semi-structured interviews and questionnaires were carried out in a rural primary school in England with the sample

consisting of 2 primary school teachers and a range of Upper Key Stage 2 children.

Overall, the data suggested that science-related gender stereotypes are not currently perceived as a prevailing issue in the context of this study. The children's questionnaire responses proposed that most children enjoy learning science and that they do not hold views of scientists as being predominantly male or female. The interviews reinforced that engagement in science is not the result of gender, rather is due to the children as individuals. Outcomes of the research contribute to existing knowledge to suggest that tailoring learning to the individual children, alongside the use of role models and opportunities for group-based practical learning, are successful strategies for promoting equality and overcoming science-related gender stereotypes.

#### Review of the Literature

Perceptions of gender in science continues to be a key area of discussion in education (Mead and Métraux, 1957; Hoath,

2020, p.3). Such research has revealed student's predominant perception was that scientists were middle-aged white males wearing glasses and a white coat (Mead and Métraux, 1957, p.126). This has since become the most commonly acknowledged gender stereotypical image of a scientist (Finson, 2002, p.335) leading to narrow preconceptions about the attributes, characteristics or roles that should be obtained by men and women in society (Cusack, 2013, p.8; Stangor *et al.*, 2014, p.525). McLeod (2017) argues these are commonly negative perceptions resulting in the simplification of our social world due to social categorisation and prejudice attitudes.

The introduction of the Draw-a-Scientist Test (DAST) became the chosen method for many studies (Chambers, 1983, p.257; Finston, 2002, p.335) as an open-ended activity which assesses children's thoughts on what a scientist looks like. Chambers (1983) introduced the DAST when conducting similar research to Mead and Métraux (1957). His results reflected the same attitudes as those observed almost 30 years prior; only 0.6% of his sample of 4807 children aged 5–11 years drew a scientist as a woman, reinforcing the stereotype that scientists are typically viewed as male.

Contemporary research to that of Chambers (1983) continues being carried out in countries across the world (Samaras *et al.*, 2012; Miller *et al.*, 2018; Thompson *et al.*, 2019). These studies highlight a positive upward trend in the perception that women can be scientists, with such ideologies being more commonly reflected in the children's drawings or verbal discussions (Samaras *et al.*, 2012, p.1545; Miller *et al.*, 2018, p.1947; Thompson *et al.*, 2019, p.7). For example, compared to the 0.6% of participants that drew a woman as a scientist in 1983, research conducted in 2019 (n=210) found 24% of participants drew a female figure (Chambers, 1957, p.261; Thompson *et al.*, 2019, p.7). Nonetheless, this is still an imbalanced perception of the role of women in science and they remain underrepresented in science disciplines and in children's overall perceptions (Miller *et al.*, 2018, p.1953).

The primary science National Curriculum (NC) at Key Stage 1 and Key Stage 2 highlights numerous influential figures within the non-statutory guidance throughout various topics (DfE, 2013; Spring, 2018, p.5). Whilst there is representation of female figures such as Mary Anning and Jane Goodall, the ratio of men to women is not of equal representation or a positive reflection of modern-day science (DfE, 2013, p.27; DfE, 2013, p.32; Sinclair and Strachan, 2016). It could be argued that this contravenes the Equality Act (2010) as education should not discriminate against children in accordance with any protected characteristics – including their gender (Equality Act, 2010). It must be remembered that these suggested influential figures are non-statutory and so giving teachers autonomy over which influential figures to use (DfE, 2013, p.12). Furthermore, consideration should be given to wider resources including textbooks (PISA, 2015, p.6). Males are three times more likely to be featured in primary science textbooks (Caldwell and Wilbraham, 2018, pp.1-9) whereas if images of women working in science occupations were increased then this would demonstrate to young girls that working in such disciplines is achievable and fulfilling (Caldwell and Wilbraham, 2018, p.1).

Teachers are fundamental in shaping the values and philosophies children develop, meaning they must uphold an inclusive approach to teaching and learning (Arthur *et al.*, 2006, p.433; DfE, 2011, pp.1-2) by challenging their own pedagogy, attitudes and ethos (Scantlebury, 2012, p.1;

Kerkhoven *et al.*, 2016, p.1; Davenport, 2020, p.7). This notion of a role model is used widely in modern-day society and its meaning has taken on numerous iterations since it was established in the 1950s by sociologist Merton, who introduced it as the idea of an individual illustrating the required behaviours associated with taking on a specific role (Morgenroth *et al.*, 2015, p.467). Every role model that children discover increases the number of possible selves they potentially internalise, due to each possible self being the result of immediate social experiences (Markus and Nurius, 1986, p.954). Research by Carsten-Connor and Danielson (2016) found that girls who initially held negative stereotypical ideas around women working in science changed such beliefs and developed new positive science-related possible selves after interactions with female scientists. Positive role models are believed to increase motivation, foster inspiration and accumulate resilience and self-efficacy (Lockwood, 2006, p.36; McIntyre *et al.*, 2011, p.301; Morgenroth *et al.*, 2015, p.465) suggesting their importance in the classroom.

The role of the teacher and their ability to change children's perceptions of themselves can be explored further using the notion of growth mindset established by Dweck who defined fixed mindsets as the belief that each of these traits are predetermined and cannot be changed; in comparison to growth mindsets which is the belief that they can be developed through effort, experience and practice (Dweck, 2014; Hildrew, 2018, p.2). Gender stereotypes promote the ideology that boys are naturally better at science than girls (Scantlebury, 2012, p.2), meaning girls with fixed mindsets may disengage from the subject due to believing they are not suited to such discourse because of their gender (Archer *et al.*, 2013, p.187). However, a focus on fostering a growth mindset allows children to find inspiration in others' achievements and subsequently work harder to better their own performance (Hildrew, 2018, p.3) which has the potential to be applied to girls in primary science and beyond, thus highlighting the importance of this area of research.

## Research Questions

- Do Key Stage 2 children perceive scientists as predominantly male or female?
- Do teachers still perceive gender stereotypes in science to be a prevailing issue in primary schools?
- What strategies do modern-day primary schools use to overcome gender stereotypes in the teaching of science?

## Method

This case study (Hope, 2016, p.64) was a mixed-methods approach using interviews and questionnaires to gain a more holistic view through both qualitative and quantitative data (Denscombe, 2017). Data was collected from schoolteachers and Upper Key Stage 2 children in a rural primary school setting as a small-scale case study in the spring term of 2022. The school was selected for its active development of science curriculum provision and its prominence in curriculum intent. It must be noted that an exploratory sample size as part of this small-scale research enabled study of a specific context rather than an accurate cross-section of the population (Denscombe, 2017, p.34) and therefore wider generalisation may become negligible due to the small sample size and specific context (Erickson, 2020).

The research participants comprised of the science co-ordinator and the year 5/6 teacher. These were chosen through critical-case sampling (Cohen *et al.*, 2018, p.199; Cohen *et al.*, 2018,



p.307) as they held key positions and considerable knowledge relevant to assist in answering the research questions. The questions asked were open-ended and the interviews were semi-structured to enable the researcher to follow up ideas, further question particular responses and pursue alternative lines of discussion (Gillham, 2000b, p.41; Bell and Waters, 2018, p.210).

To gather data regarding the perception of a scientist from the view of KS2 children, a self-completion written questionnaire was given to the children in the year 5/6 class with individual participants accumulated through opportunity sampling (McLeod, 2019a). Quantitative, ordinal data was gathered through closed questions involving a Likert scale, which allowed for statistical analysis (Bandalos, 2010, p.972). Using Likert scales rather than semantic differential scales assists in creating consistent interpretations across participant answers as the scale levels have been explicitly labelled (Dillman et al., 2014, p.159). Qualitative data was collected through an open-ended question and a DAST to gain additional descriptive responses (Chambers, 1983, p.257; McLeod, 2018). DAST is successful when gaining an understanding of perceptions of a scientist from the viewpoint of children, suggesting it is high in construct validity (Markus and Lin, 2010, p.229). Ethical guidelines of both the British Educational Research Association (BERA) and the University of Northampton were upheld throughout the research process including the gaining of parental/guardian consent (Alderson and Morrow, 2011, p.102; BERA, 2018).

The qualitative interview raw data was systematically analysed and categorised (Price, 2009, pp.155-156) through open-coding. Correlations between both interviews were then established using axial coding (Simmons, 2018, pp.79-80). The quantitative data collected from the questionnaires was collated in tables format for comparison and qualitative DAST data was analysed and converted into quantitative data for analysis.

## Findings and Analysis

### RQ1 Do KS2 children perceive scientists as predominantly male or female?

The number of children that drew scientists as female were almost equal to the number of males drawn which is significantly different to the original DAST data collected by Chambers (1983) whereby only 0.6% of his sample drew women. Likewise, more contemporary research by Thompson et al., (2019) in which 23.8% of his sample drew female scientists also showed considerably more stereotypical views than those collected in this study. This suggests there has been significant improvements in reducing science-related gender stereotypes during recent years. The lack of gender stereotypes held by the sample children was reinforced by responses given in the questionnaire, such as when given the statement 'scientists can be women', 100% of the children responded strongly agree. Similarly, 100% of the children responded agree or strongly agree to 'scientists can be men' suggesting the positive improvement in promoting girls in science has not been to the detriment of boys, but rather shows developments in promoting equality. Overall, there was no predominant perception that scientists are male or female; the children mostly drew them as their own gender as seen in Figures 1, 2 and 3.

That said, the research highlighted that despite gender-related stereotypes becoming negligible, stereotypical interpretations of scientists, regardless of gender, remained prevalent. The

most significant finding was the overriding ideology of scientists being individuals wearing lab coats and glasses or goggles, which appears to have remained consistent for over 50 years (Mead and Métraux, 1957, p.126). Overall, 14 of the 15 DAST responses suggested scientists wear lab coats and 10 of the 15 children made reference to them wearing glasses or goggles (see Figures 2 and 3). Only 1 child made no reference to any stereotypical characteristics suggesting, although in this context gender stereotypes have been overcome, the overall perception of scientists and their job role remains unchanged. This implies the children may have been primarily exposed to images and interactions with scientists that possess these features and therefore have developed these stereotypical views (Arendt and Northup, 2015).



Figure 1: Image drawn by female Participant 'A'

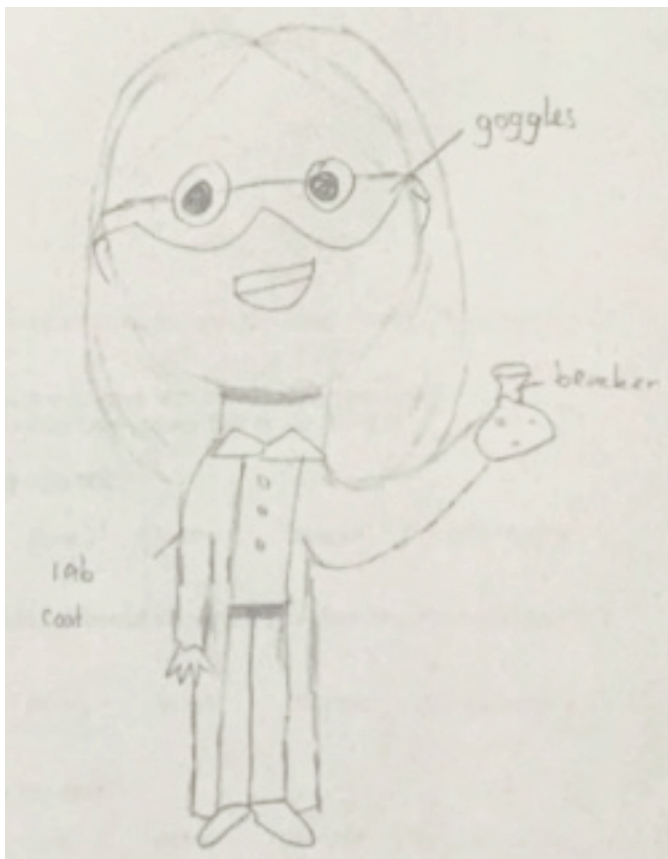


Figure 2: Image drawn by female Participant 'B'



Figure 3: Image drawn by male Participant 'C'

### RQ2 Do teachers still perceive gender stereotypes in science to be a prevailing issue in modern-day primary schools?

For this research, it was important to gain an understanding of teachers' perceptions of gender differences in science as they have a fundamental role in shaping the attitudes and philosophies held by children (Arthur et al., 2006, p.433; DfE, 2011, pp.1-2). Teachers' perceptions of science-related gender stereotypes may present an explanation for the children's questionnaire responses (Scantlebury, 2012, p.1; Kerkhoven et al., 2016, p.1).

The science co-ordinator and year 5/6 teacher participated in semi-structured interviews where they expressed similar opinions about the lack of science-related gender stereotypes they were currently experiencing, with one explaining "most children are highly engaged" and the other reinforcing this by explaining that engagement [in science] is good [from the girls] and they "have a positive attitude" towards the subject. These teacher perceptions were supported by the questionnaire data as 9 of the 11 children responded agree or strongly agree to "I like learning science". Furthermore, the year 5/6 teacher justified their opinion of experiencing a lack of science-related gender stereotypes by explaining that the school had a visit from a female scientist and "the children didn't make any comment that it was a woman in any surprise". Both interviewees explained "you have to be specific to a child, rather than a gender" and "it is more about them as an individual".

During the interviews, the opinion that "everybody can do whatever they want if they work hard" was expressed, suggesting a reason for the lack of gender-related stereotypes currently present. This is directly associated with Dweck's (2015) concept of growth mindset, which if promoted would enable the children to understand that they are able to achieve regardless of any stereotypical perceptions in society (Hildrew, 2018, p.3). Despite the concept not directly being referred to by the interviewees, the school promotes a growth mindset culture on their website and through their school values, implying this is something embedded within teaching and learning.

### RQ3 What strategies do modern-day primary schools use to overcome gender stereotypes in the teaching of science?

To explore this question, approaches used by the school when teaching science were compared with the children's attitudes towards science and perceptions of scientists to critique their success.

Findings from this study support the notion that same-gender role models are significant in impacting attitudes, achievement and interest in subject areas and professions for both boys and girls (Carsten-Connor and Danielson, 2016). Throughout the interviews both individuals were expressive in their views about inclusion of "role models", "visitors" and "modelling" in the teaching of science. This alone does not signify the importance or impact these approaches possess, yet when accompanied by the questionnaire data whereby most children drew a scientist as their own gender and 9 of the 11 children responded agree or strongly agree to "I like learning science" it can be proposed that role models promote equality and enjoyment. The science co-ordinator advocated the internalisation of self when discussing role models by expressing that children should be able to "see themselves as

possible scientists” and understand that “science can come into many, many jobs”. However, although the children present minimal gender-related stereotypes, most children responded neither agree nor disagree to “when I am older, I could choose a job that involves science if I wanted to” suggesting the possible selves they have accumulated may be limited due to their perception of science job roles remaining stereotypical (Mead and Métraux, 1957, p.136; Finson, 2002, p.335). This indicates the children may need exposure to larger varieties of science-related role models to change current perceptions of individuals wearing lab coats and glasses, because if aware that science is fundamental to a vast number of professions, their interest in working in jobs involving science may increase (McIntyre et al., 2011, p.301; Morgenroth et al., 2015).

The case-study school has adapted a topic-based curriculum design meaning learning is usually cross-curricular and science is embedded within the topic area. The data from this study advocates omitting National Curriculum (DfE, 2013) non-statutory guidance from the teaching of science; it was identified in the interviews as being hardly used with the year 5/6 teacher explaining that it was only used when most relevant. This approach could be argued as successful in promoting equality as the children in the study have not been exposed consistently to stereotypical white male scientists advocated in the non-statutory NC guidance (DfE, 2013).

The most consistent finding from the interviews was the promotion of ensuring learning is specifically tailored to the children. This was something not originally considered prior to conducting the research yet may have considerable impact on the positive non-gender stereotypical views presented by the children. Davies (2011) states successful teaching of science should comprise of an understanding of the needs and interests of the children, knowing their abilities and connecting with their lives. Advocating the same notion, the interviewees expressed that teaching should begin with “where their interests...confidence...ability is and develop these” and learning should be given a context to “make children conscious of the world around them”. This suggests developing teaching of science on these foundations encourages gender to become extraneous as children are engaged in the learning as it is enjoyable and relevant to them as a cohort or individual (Cross and Bowden, 2009, p.7).

It is important to note the additional teaching strategies revealed throughout the interviews, which included “being practical”, “group-based’ learning including “mixed-aged groups” and “mixed-gender groups” and opportunities for “discussions”. The significance of these approaches is that they engage children and demonstrate that anyone is able to participate, regardless of age, gender or ability (Loxley et al., 2014, p.4, p.54, p.60). This research suggests these strategies successfully assist in overcoming science-related gender stereotypes for these particular children.

## Conclusion

The data has highlighted that the prevailing ideology that scientists are male is considerably less prominent in this primary school in comparison to previously acknowledged research (Mead and Métraux, 1957, p.126; Chambers, 1957, p.261; Miller et al., 2018, p.1947; Thompson et al., 2019, p.7). The children responded gender-neutrally in the questionnaire and the teacher’s interviews reinforced that science-related gender stereotypes should not currently be regarded as an

issue in this context. However, the data reinforced the stereotypical perception of the job role of scientists as being individuals in lab coats and glasses, the researcher believed it would be interesting to explore this further and examine the impact this ideology has on further education and career choices, as well as how it could be overcome in the future. Furthermore, this research has broadened understanding of the impact that prejudiced attitudes have on children’s development of expectations of themselves and others (Culhane and Bazeley, 2019, p.11). Enjoyment and equality in science can be promoted by introducing role models, tailoring teaching and learning to individual children and providing opportunities for practical, group-based work.

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## How prepared are Primary Pre-Service Teachers when teaching Physical Education? What impact do their prior experiences of PE have on their preparedness to teach the subject?

### Part Two

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#### Introduction

This article, the second of five, focuses on a research question from a Master’s in Education thesis considering the impact of Primary Pre-Service Teachers’ (PPSTs) prior experiences of physical education (PE) upon their preparedness to teach the

subject after competing Initial Teacher Education (ITE). Making links with educational theories including Ecological Systems Theory, Emotional Intelligence, Growth Mindset and the Four Stages of Competence, this article explores who impacted PPSTs’ early PE experiences and the factors underpinning

their perceptions either negatively or positively. The article provides a literature review followed by a brief overview of the methodology (a comprehensive overview of the research's theoretical framework and methodology is provided in *The Study Outline – Part 1*, Chapman, 2023) before summarising the data's findings and outlining initial recommendations.

**Literature Review**

The Reflective and Academic Engagement domain of the Professional Knowledge Model (PKM) (Randall, 2016) (Figure 1) states teachers' prior experiences can impact their attitudes towards teaching PE; subsequently, these experiences must be reflected upon. This supports Bronfenbrenner's Ecological Systems Theory (1979) which states children's environments are nested arrangements of structures, each contained within the next, in order of how significantly they impact a child (Figure 2). The theory provides a holistic, inclusive approach of all systems children are involved in (Hayes et al, 2017). Those within the microsystem (family, peers and teachers) can impact learners positively and negatively as interactions within this system are often personal occurring within the immediate environment. Academics agree: Ginott (1972) noted teachers possess the power to inspire, humiliate, hurt and heal learners and considering Emotional Intelligence, Rich (2010) suggests teachers must apply PE approaches carefully as autocratic teaching cultivates humiliation and disregard towards pupils' emotions. Pickup (2012) argues once negative perceptions are

established, including, being able to teach PE or not, they are hard, but not impossible, to amend.

Research highlights that during school placements, PPSTs use prior experiences when delivering PE (Morgan and Bourke, 2008). Many contest this is not sufficient as PPSTs' prior knowledge and understanding of PE pre-ITE is limited (Chedzoy, 2000; Tsangaridou, 2012) and their experiences are often having previously led physical activity and school sport, not curriculum PE (Huddleston, 2021).

Morgan and Hansen (2007) note that PPSTs' prior experiences may negatively impact the PE experiences of the children they teach citing limited self-regulation, whilst Morgan and Bourke (2008) suggest PPSTs are concerned about PE pre-ITE, suggesting more positive prior experiences are needed, developed through reflection and group work to improve self-esteem.

Studies maintain that physically active PPSTs, those with growth mindsets, are more likely to promote positive PE experiences for children (Hayes, 2017; Cheung, 2020). Dweck (2006; 2014) suggests through hard work, instruction and positive language, individuals can remove themselves from the tyranny of now, limit helplessness and maximise abilities in areas, like PE. Warburton and Spray (2016), suggest fixed mindsets exist within PE due to prior experiences, and to progress, individuals should acknowledge these developing self-awareness and self-regulation.

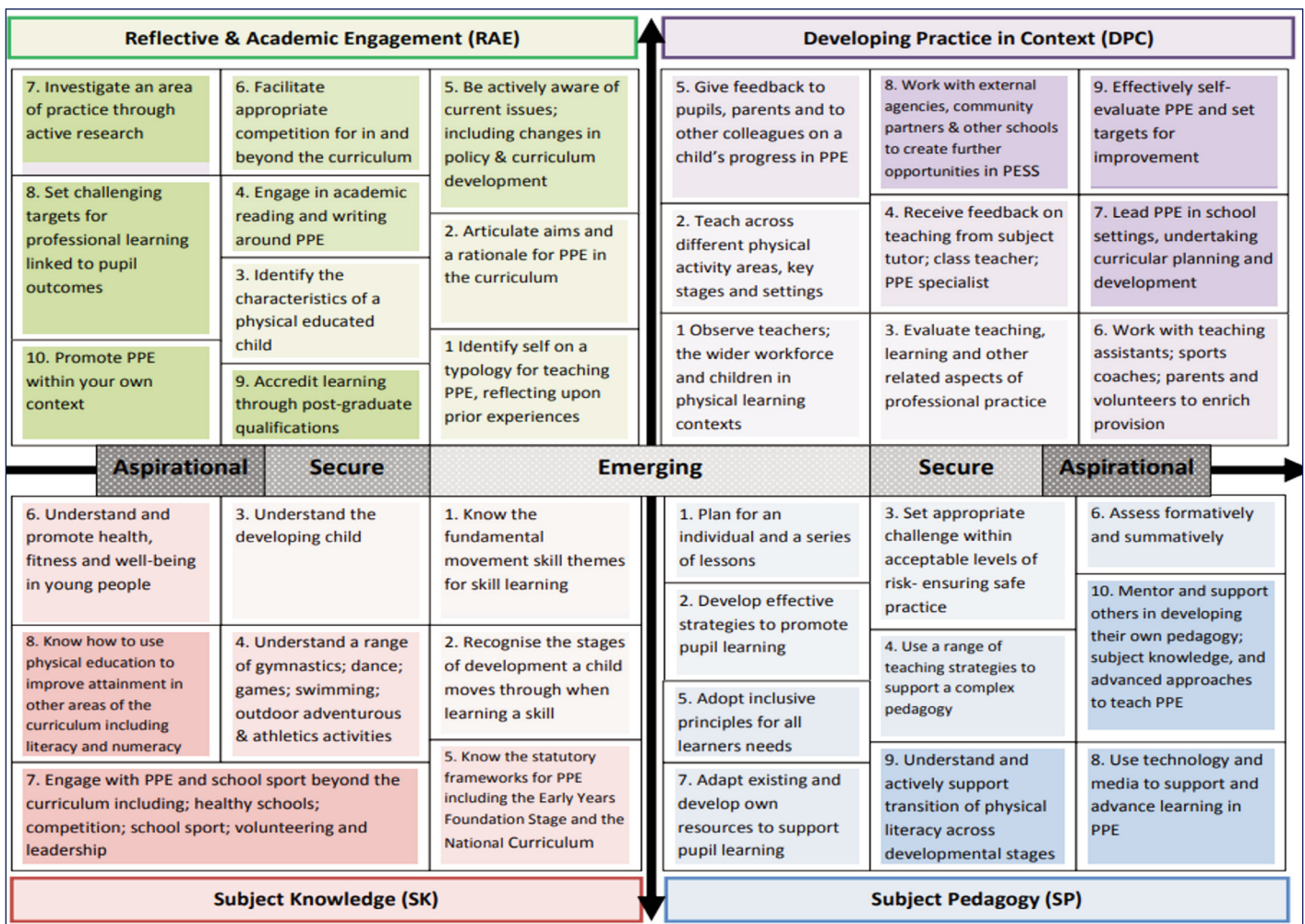


Figure 1: Professional Knowledge Model (Randall, 2016).



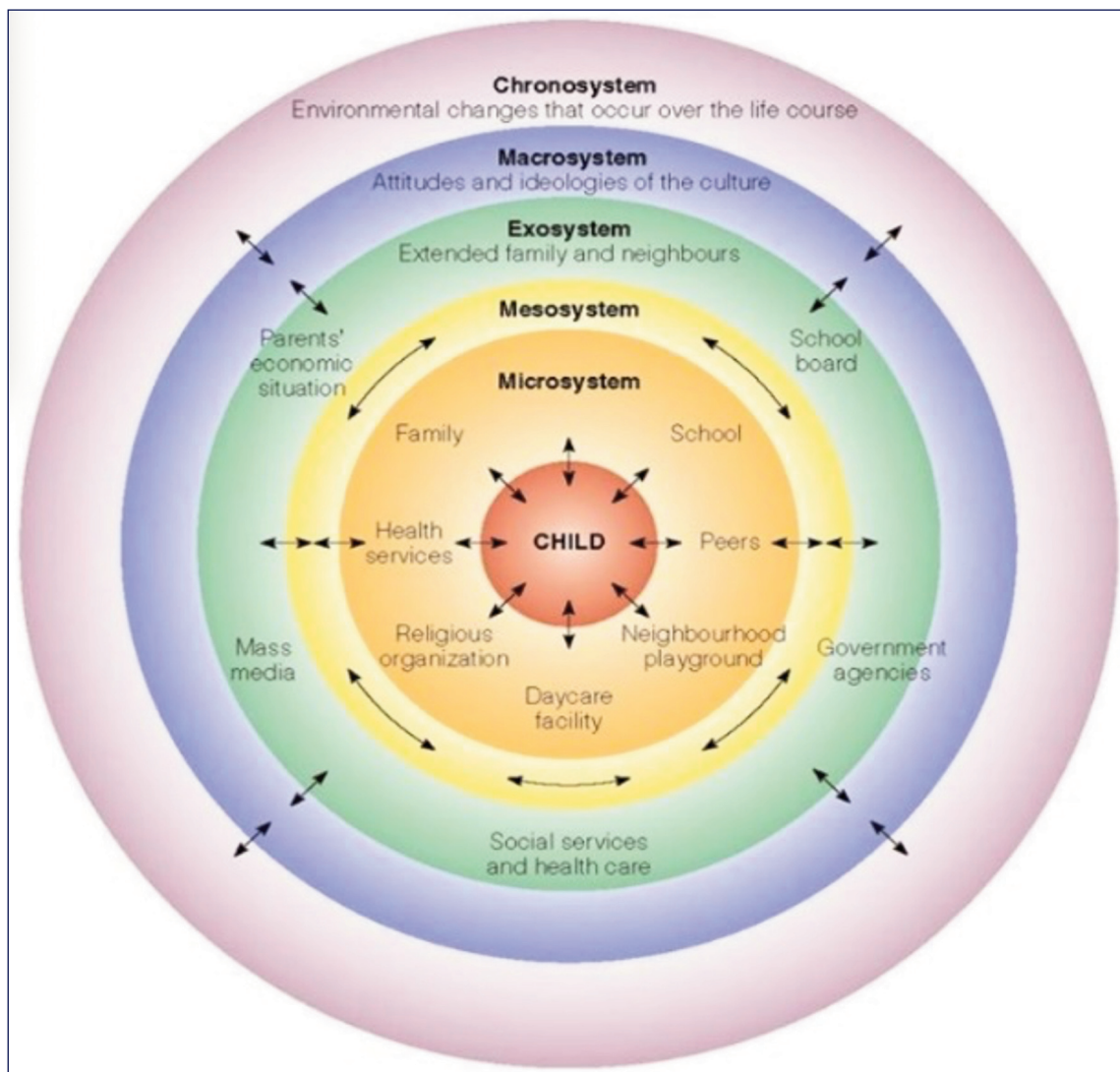


Figure 2: Bronfenbrenner's Ecological Systems Theory (1979).

The notion of prior experiences impacting preparedness is not PE specific; parallels exist with other subjects including mathematics where studies demonstrate large percentages of PPSTs experience high levels of anxiety pre-course due to past experiences of failing (Gresham, 2007; Boyd et al., 2014), drawing concerns, like in PE, that PPSTs' negativity could transfer to children, generating long-term educational implications (Sloan et al., 2002).

### Methodology

In this study, research was conducted within a Higher Education Institution cohort considering organisational boundaries (Cohen et al., 2018). Using a case study approach, participants' truths at a specific moment were explored using a pragmatic paradigm to solve a real-life problem using fit for purpose 'what works' methods (Patton, 1990).

A mixed methods research approach of online questionnaires (n=39) followed by semi-structured interviews (n=6) with questions based upon the PKM (Randall, 2016) (Figure 2), provided greater opportunities to understand participants' truths by converging quantitative and qualitative methods (Feilzer, 2010), increased data validity and improved possibilities of generating stronger recommendations for practice (Denscombe, 2010).

When analysing data, coding identified key themes (Braun and

Clarke, 2006). With quantitative data, an in-built JISC Survey analysis tool was used to generate statistics and charts; for qualitative data, transcriptions were made using Otter.ai (Otter.ai, 2022), which were manually coded into primary and secondary themes.

Ethically, before researching, the BERA Guidelines (2018) were consulted to ensure the study was rigorous, with ethical approval given by the institution; participant consent was obtained during the questionnaire and in advance of interviews.

### Findings

Within this study 64.1% (n=25) of participants suggested their early PE experiences negatively or positively impacted their ability to teach the subject. The research investigated this area by exploring who impacted PPSTs' early experiences and the factors that underpinned the negative or positive PE views.

Bronfenbrenner (1979) suggests, those within the microsystem – family, peers and teachers – can impact learning experiences negatively and positively; collected data (Figure 3) was consistent with this theory as 41% (n=16) of PPSTs highlighted their teachers and sports coaches, across primary and secondary phases, were the main contributors to negative experiences. Additional reasons for negative perceptions included teachers focusing on naturally sporty children (33.3%, n=7); teachers giving little encouragement to PPSTs who found PE challenging

(23.5%, n=5); and PPSTs being forced into doing PE (9.5%, n=2). Interviewees noted they were “not encouraged despite it being obvious they were anxious about PE” and teachers were “only interested in children who were already good at sport.” This underlines the importance educators have in shaping pupil views albeit sometimes unconsciously; The Youth Sport Trust (2021) found 40% of pupils believed teachers and coaches inspired their physical activity. Conversely, 56.4% (n=22) of participants noted teachers positively impacted their experiences, supporting Dyson (2014) who noted that through establishing engaging environments, pupils can be positively influenced.

	Negatively	No impact	Positively
Family members	5.1% (n=2)	43.6% (n=17)	51.3% (n=20)
Friends and peers	15.4% (n=6)	12.8% (n=5)	71.8% (n=28)
Teachers	41% (n=16)	2.6% (n=1)	56.4% (n=22)

Figure 3: Groups who influenced PPSTs’ prior PE experiences

Additionally, 15.4% (n=6) suggested friends and peers negatively impacted early experiences meaning PPSTs must consider their own impact as teachers more than the influence peers might have. Participating PPSTs cited several reasons for this including “being bullied by peers due to their weight increasing their self-consciousness” and being “influenced by friends who didn’t enjoy PE.”

PE schemes, including RealPE (Create Development, 2017) give teachers tools to support peers working together developing social and personal skills through positive reinforcement (Chapman, 2021). Collaboration can reduce potential negative prior experiences friends and peers afford one another. One interviewee experienced RealPE noting the scheme “supported planning, developed their skills and helped friends and peers work well together [because] they got along in lessons.” However, 71.8% (n=28), stated friends and peers positively impacted prior experiences.

Despite Bronfenbrenner highlighting the family’s role, data showed family negatively impacted prior experiences of just two participants with 51.3% (n=20) noting a positive impact implying many participants’ families provided strong vicarious experiences and were role models of PE.

PPSTs begin ITE with different starting points of preparedness with some possessing less confidence compared to others. Despite this, individuals used negative experiences effectively when teaching PE; one interviewee outlined negative pre-course experiences, but noted lectures prepared them to be “aware of their own preconceived opinions of PE; they used this when planning lessons, making sure when teaching, they were learning with the pupils, pushing themselves to create positive experiences.”

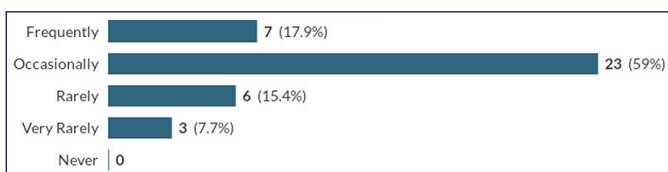


Figure 4: How regularly PPSTs had opportunities to discuss their prior PE experiences.

Within lectures, PPSTs were encouraged to discuss prior experiences; 76.9% (n=30) believed they occasionally or frequently did this (Figure 4). Reflection opportunities can develop growth mindsets (Dweck, 2006); within PE, embracing fixed mindsets helps individuals develop their Emotional Intelligence (Warburton and Spray, 2016). Trainees must recognise and control their instincts so they can positively manage the emotions of children (Strong et al., 2020). However, one interviewee outlined “because lecturers were so enthusiastic about PE,” they “didn’t feel they could raise feelings” reinforcing prior negative experiences about PE. Rich (2010) notes, interaction between teacher and student can positively or negatively impact mental health and achievement with Usher and Pajares (2008) suggesting being attentive promotes higher student self-efficacy, positively impacting motivation and perceptions.

**Negative perceptions**

When asked about feelings concerning teaching PE pre-ITE, 76.9% (n=39) of participants provided negative responses highlighting ‘nervous’ (n=10), ‘scared’ (n=7) and ‘unprepared’ (n=5) most frequently (Figure 5).

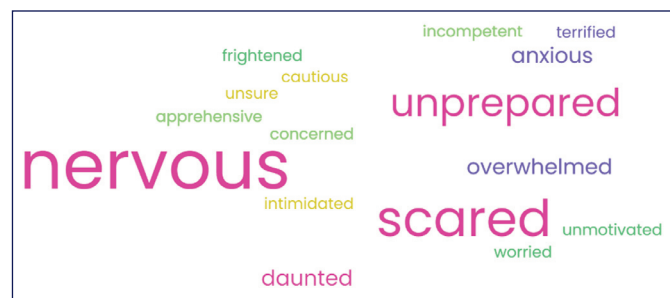


Figure 5: PPSTs’ negative feelings towards teaching PE pre-ITE.

Overall, 82.1% (n=32) had not taught any PE pre-course (Figure 6) and 66.7% (n=26) had not coached any sports (Figure 7) reinforcing why the most significant reasons for negative responses were a lack of previous training or experience delivering PE (33.3%, n=13) meaning pre-course opportunities for vicarious experiences, required to enhance competency, were restricted (Randall, 2015). Other factors included poor school experiences (26.7%, n=8) and personal struggles with school PE (13.3%, n=4). Interviewees reinforced this stating they “only ever had negative experiences with PE” being told they “couldn’t do PE because they weren’t a sporty person” and “growing up as a bigger child, PE experiences were not positive in primary and secondary leading to no interest in PE when starting university.”

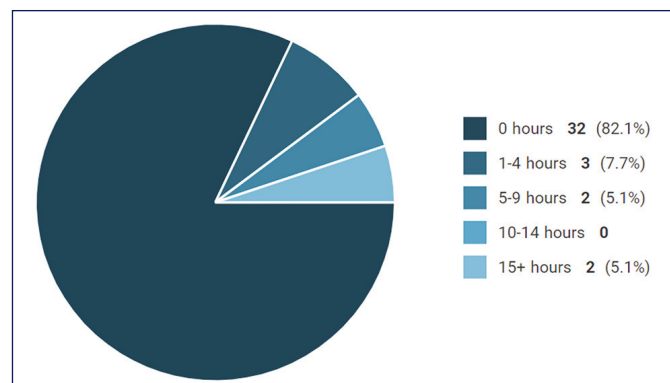
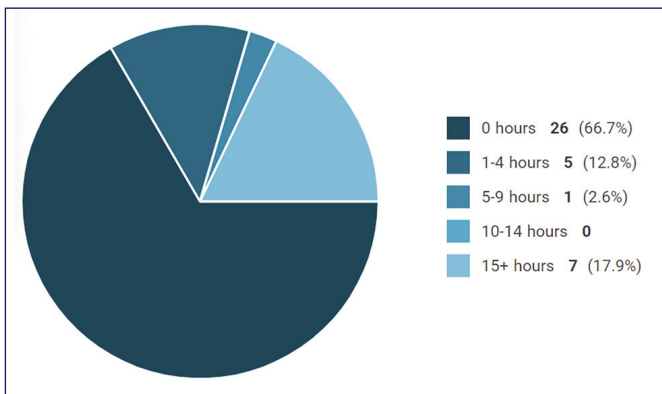


Figure 6: The number of hours PPSTs had teaching curriculum PE pre-ITE.

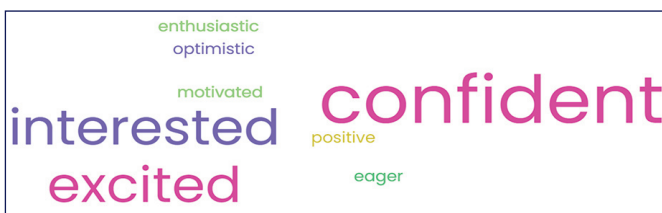


**Figure 7: The number of hours PPSTs had coaching sports pre-ITE.**

Dweck (2006) suggests individuals with negative perceptions may exhibit fixed mindsets and helplessness learning something new. However, Burch's Four Stages of Competence (Adams, 2015) suggests awareness of negativities, means individuals are 'consciously incompetent' recognising new skills must be learnt whilst appreciating barriers exist preventing proficiency. It could be argued PPSTs need more quality PE instruction within ITE to prepare them to teach the subject effectively rather than relying on prior experiences; opportunities to address mindsets and develop awareness can impact their efforts (Morgan and Bourke, 2008).

### Positive perceptions

Contrastingly, 23% (n=9) of participants offered positive responses concerning PE pre-ITE; perceptions PPSTs referenced most frequently included 'confident' (n=4), 'excited' (n=3) and 'interested' (n=3) (Figure 8).



**Figure 8: PPSTs' positive feelings towards teaching PE pre-ITE.**

Respondents outlined they had competed in sports including gymnastics, swimming and dance noting they "grew up doing sports, playing them, participating in team events so felt confident." Furthermore, 88.9% (n=8) worked or volunteered in schools and 44.4% (n=4) experienced teaching sports stating they "played and taught netball, football and hockey and swam in galas having skills to rely on." However, Huddleston (2021) urges caution, despite some PPSTs observing and delivering physical activity and school sport, that differs from curriculum PE.

A correlation exists between PPSTs acquiring vicarious experiences with positive pre-course perceptions, compared to those who did not. An interviewee reinforced this as "reflecting on their positive experiences helped them deliver lessons thinking about their learning." However, positive outlooks could result in over-confidence. Prior experiences within physical activity and school sport do not equate to proficiency delivering PE and understanding the National Curriculum; School Sport and Curriculum PE are different entities (AfPE, 2019). Therefore, confident PPSTs must not become complacent, what Burch refers to as 'unconscious

incompetence,' where trainees do not recognise new skills require development and rely on previously developed skills without improving practice.

### Conclusion

PPSTs' prior PE experiences can be negative or positive (Morgan and Hansen, 2007) influencing ITE starting points; perceptions may continue throughout training impacting PE preparedness, but these views are not fixed and subjective. Negative perceptions are difficult but not impossible to change (Pickup, 2012); developing Emotional Intelligence through effort and discussing concerns can alter mindsets and reduce helplessness (Dweck, 2006); PPSTs must develop the emotional skillsets required to teach PE to different primary children (Strong et al., 2020) and become 'consciously competent.'

PPSTs outlined negative pre-ITE PE perceptions yet data shows 86.2% (n=33) of participants agreed or somewhat agreed their course prepared them to deliver PE. Therefore, the mindset PPSTs begin ITE with does not necessarily equate to post-course preparedness; some PPSTs reflect positively upon negative experiences: two interviewees used their negative prior experiences to develop self-awareness ensuring they "learned PE with the children" and were "inclusive in their practice."

Contrastingly, PPSTs with positive prior experiences appear confident and more likely to promote PE having had experiences within schools through competing, coaching, working or volunteering (Hayes, 2017; Cheung, 2020). However, these experiences are not curriculum PE; these PPSTs must develop subject knowledge and subject pedagogy to become better prepared (Randall, 2016).

### Recommendations

Findings suggest PPSTs can be further supported in exploring their prior PE experiences; trainees themselves and lecturers have roles to play.

Pre-ITE, PPSTs could acquire more experience observing and teaching PE (Morgan and Bourke, 2008) achieved through working as a Teaching Assistant or volunteering. When doing so, individuals must ensure experiences are of curriculum PE, not school sport or physical activity as these differ (Huddleston, 2021).

Lecturers could plan Assessment for Learning opportunities to ascertain a cohort's perceptions; this would encourage adapted provision to incorporate additional discussion opportunities to explore feelings with specialists and peers supporting one another. PPSTs felt the PKM could prove useful here because "by RAG-rated statements at the beginning of the course, they could recognise where they needed support and discuss this with lecturers."

Additionally, lecturers must continue developing their Emotional Intelligence showing awareness of the impact they could have on PPSTs' PE attitudes. Bronfenbrenner (1979) outlines the significance teachers have on learners' experiences; this study found teachers are three times more likely to impact pupils' PE perceptions than peers.

### What's Next?

The next article, part three, focuses on the study's second research question exploring whether university-based lectures effectively develop PPSTs' PE subject and pedagogical

knowledge. It outlines how a combination of discrete PE lectures alongside a cross-modular approach and school placement experiences help develop understanding in these areas, subsequently developing preparedness.

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The event will provide useful guidelines on how educational institutions can support fasting students and staff to take part in school sport.

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Dr Irfan Khawaja has over 13 years' teaching experience including mainstream primary and secondary schools, higher education, and internationally. He has also worked as part of the Extended Schools Programme in a multi-skills community sports coach role. As a teacher, Irfan was Curriculum Coordinator for Key Stage 5, before becoming Head of Department. He has delivered INSET teacher training sessions and gives keynote addresses on his research focusing on children's physical activity and mixed-methods. Irfan has a diverse range of coaching qualifications and has delivered guest lectures nationally and internationally.

Conference presenter: Dr Irfan Khawaja,  
Senior Lecturer in Physical Education



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