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- Primary Teachers' Attitudes Towards the Inclusion of Learners with Autism Spectrum Disorder
- Supporting Self-Efficacy Among Teachers Working in Special Classes for Autistic Pupils
- Maths Textbooks and Inclusive Practices in the Senior Classes of Primary Schools
- Personal Reflection on Practice as a Basic and Senior High School Teacher Using Gibbs Reflective Model: Universal Design for Learning (UDL) in Focus

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Contents

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Exploring Primary Teachers' Attitudes Towards the Inclusion of Learners with Autism Spectrum Disorder (ASD) in a Mainstream Environment

This article explores teachers' attitudes towards the inclusion of learners with ASD, which has been the focus of worldwide debates for decades. Due to an increase in prevalence, more learners with ASD attend mainstream environments, providing opportunities and challenges for teachers. This emphasises the prerequisite of knowledge and understanding of this unique group of learners. Furthermore, teachers are left to interpret inclusion based on individual attitudes in the absence of a unified understanding, meaning all practices could potentially be viewed as inclusive. These elements have definite consequences for teachers who wish to include learners with ASD. Consequently, teachers' attitudes towards the inclusion of learners with ASD in a mainstream setting are examined in this article, informed by cognitive, affective, and behavioural factors. The findings represent the views of fifteen teachers from one rural national school, which indicated that inclusion is viewed favourably, and opportunities for further development are identified.

Keywords: *Inclusion, Autism Spectrum Disorder, Mainstream schools, Teacher Attitudes*

CHRISTION HUTCHINSON is a primary school teacher for learners with Autism Spectrum Disorder in Co. Waterford, and has taught in this specialised setting for 16 years. MARIA CAMPBELL is Director of Graduate Programmes in the School of Education, St. Angela's College, a College of the National University of Ireland, Galway.

Corresponding author: *christion.hutchinson@hotmail.com*

INTRODUCTION

What is Inclusion? Debates and Contested Understandings

According to Winter & O' Raw (2010), many authors have attempted to define inclusion, thus confirming its complex nature. While a plethora of literature

explores the fundamentals of inclusion from an educational perspective, based on this premise, inclusion may be viewed as how educational settings can accommodate difference, by embracing all learners, irrespective of ability, and treating everyone equally whilst recognising individuality. Therefore, inclusion is not simply physical placement (Keane et al., 2012) or offering separate provision (Day & Prunty, 2015), both of which lead to marginalisation and can promote exclusion (Gabel et al., 2009). Rather, as Booth and Ainscow (2002) maintain, inclusion involves schools adopting cultures, policies, and practices geared toward addressing the diverse student population in their local community. This perspective aligns with UNESCO (2005), indicating inclusion is a process in which diversity is celebrated by altering practice to support all learners learning together to the best of their ability. This interpretation positions inclusion as an ethical issue underpinned by rights ideologies, concerned with foregrounding the self-development of the learner, instead of something done to a discrete population (Allan, 2005). These sentiments capture my view on inclusion, which affirms the needs and rights of learners with disabilities to fully enjoy all their fundamental freedoms and human rights (United Nations 2006) without discrimination (United Nations 1990). From this perspective, for inclusion to occur, all learners need to be exposed to a diverse range of learning opportunities, while acknowledging that various policies and practices are required at national and local level to support this vision of inclusion. Thus, Lisaidou (2012) sums up the beliefs of many on inclusion by describing it as a "semantic chameleon", as its definition varies based on context, interpretation, and location.

This article focuses on a selection of findings from a master's dissertation, exploring how teachers can be supported to adopt pedagogies that promote the inclusion of learners with Autism Spectrum Disorder (ASD) in mainstream classes. Teachers' attitudes towards the inclusion of learners with ASD are examined while cognisant that this is only part of the wider remit of the study. As an educator for learners with ASD, my priority is their inclusion in a mainstream setting. This can be challenging as learners with ASD present individually due to their unique cognitive, social, and behavioural characteristics (Simpson, 2004). This highlights the need for teachers to respond to these challenges, while also responding to the various needs of all learners, with teacher attitudes significantly impacting this process.

LITERATURE REVIEW

According to Rodriguez et al. (2012), teachers' attitudinal responses are crucial for the successful inclusion of all learners. Attitudes are defined by Gall et al. (1996)

as a view of something particular, while Eagly and Chaiken (1993) state attitudes are "a psychological tendency expressed by evaluating a particular entity with some degree of favour or disfavour" (p.1). They explore attitudes by identifying a tripartite classification of cognitive, affective, and behavioural, which I use in my thesis; firstly, 'Cognitive' referring to a belief or knowledge about a concept or idea; secondly, 'Affective' encapsulating feelings about a situation or object; and, thirdly, 'Behavioural' signifying how one responds to the situation or object. As a teacher in a primary school, I view cognitive, affective, and behavioural factors as essential and use this question to inform the research question, which asks: What factors impact teachers' attitudes when attempting to educate learners with ASD in an inclusive environment? However, it must be noted that attitudinal responses are influenced relative to the type and nature of SEN (De Boer et al., 2011). My focus is on learners with ASD specifically, as they are linked to my practice. Consequently, this article examines the impact of attitudes in relation to, firstly, cognition or teachers' knowledge of and understanding of inclusion as a concept and a practice**;** secondly**,** affection or teachers' feeling about and understanding of the needs of learners with ASD and thirdly, behaviour or teachers' actions to include learners with ASD in mainstream classrooms**.**

Teachers' Knowledge and Understanding of Inclusion

As indicated earlier, the inclusion of learners with ASD is reliant on several factors, which may include the lack of a clear definition and varying interpretations of what constitutes inclusion (Messiou, 2017), based on placement (Nilholm and Grranasson, 2017), location (Forlin et al., 2013) and/or practices (Amor et al., 2019). Furthermore, Hastings and Logan (2013) identified a lack of time for preparation and the expansive curriculum as possible contributing factors to this apprehension. In retort, Slee (2013) argues that smaller classes would support successful inclusion. While attitudes towards the principle of inclusion in Ireland have been generally positive, according to Shevlin et al. (2013), there is evidence of apprehension towards implementation. The following section unpacks the factors which may contribute to this apprehension.

It is accepted that teachers are competent agents with the necessary knowledge and skills to teach all learners (Dally et al., 2019). They maintain that mainstream class teachers have specific knowledge and skills about curriculum but add Special Educational Teachers (SETs) have additional knowledge and skills to cater specifically to learners with Special Educational Needs (SEN). Therefore, SETs could be perceived as content-knowledge "experts" (Dally et al., 2019), which may lead to an added sense of responsibility for the education of these learners (Busby et al., 2012). Dunleavy (2015) acknowledges this may occur but

emphasises that the inclusion of learners with ASD is a shared responsibility, signifying the requirement of policy at school level to indicate responsibility and support implementation. Such policy development supports the enactment of inclusion, allowing it to become a reality (United Nations, 2006). However, Roberts & Simpson (2016), maintain that policies are not automatically translated into practice due to a lack of shared understanding of inclusion (Florian & Spratt, 2013). This supports the argument that more than policy alone is required to ensure the principles of inclusion inform practices. Ultimately, in the context of the Republic of Ireland, the class teacher has primary responsibility for the education of all learners, including learners with SEN (The Education Act 1998).

Teachers' Feelings About and Understanding of the Needs of Learners with ASD

It is important to examine how teachers' feelings about and their familiarity with the needs of learners with ASD impact inclusive practice, as the inclusion of learners with ASD has been the focus of many debates worldwide for the last thirty years (Amor et al., 2019). Humphrey & Symes (2013) maintain that teachers tend to view the inclusion of learners with ASD positively. However, Oliver-Kerrigan et al. (2021) maintain inclusion is not a reality for all learners with ASD, as teachers often view them as challenging to include (Thomas et al., 2019) due to their unique characteristics (Cassidy, 2011) which require specialist pedagogies (Lindsay et al., 2013).

The inclusion of learners with ASD is crucial, as according to Ravet (2018), the prevalence of ASD is increasing globally. In Ireland, Parson et al. (2009) state there were 1,625 learners with ASD in mainstream in 2006/2007, and The Department of Health (2018) indicated there were 6,487 in 2015/2016. Furthermore, the National Council for Special Education (NCSE) (2016) maintain that they found that one in every 65 learners or 1.5% of school-aged learners, have a diagnosis of ASD, which equates to roughly 14,000 learners, which is more than previous approximations, which signifies more than a four-fold increase. This increase means that teachers will have learners with ASD in their class at some point and will have to teach them to the best of their ability (Ravet, 2011). Despite the growing numbers, Garrad et al. (2019) maintain that teachers feel they have a limited understanding of the needs of learners with ASD, resulting in teachers feeling unprepared to meet the needs of learners with ASD (Majoko, 2016). Barnhill (2014) adds that teachers who know about ASD and the needs of the ASD learner, are better equipped to understand the unique difficulties these learners experience. This indicates that knowledge of ASD and of the needs of the ASD learner are essential (Srivastava et

al., 2017) in enabling teachers to address the core conditions that impact learners with ASD, which may require input at initial teacher education and/or through continual professional development. This knowledge will ultimately impact pedagogical choices (Black-Hawkins & Florian, 2012) and how teachers facilitate inclusion (Florian & Linklater, 2010) by altering practice to accommodate all learners learning together.

Teachers' Actions/Strategies to Include Learners with ASD

Knowledge About and How to Implement Specific Pedagogies

Specific pedagogies, methodologies or strategies have benefits for all learners due to the diversity of needs in any classroom, so knowledge about which pedagogy best matches specific needs or learners is a prerequisite for inclusion. As previously stated, learners with ASD are perceived to require a specialist pedagogy. Fredrickson and Cline (2009) maintain that pedagogies and strategies that work for most learners appear to fail learners with ASD. This may be due to individual learning characteristics (Elmaci & Karaaslan 2021), including sensory reactions for example (Ravet 2015). Rodden et al. (2019) imply mainstream teachers lack knowledge of specific pedagogies which address individual learners' needs, including the sensory needs of learners with ASD. Therefore, to facilitate the inclusion of learners with ASD, adaptations to the curriculum and teaching methods are required (Ravet 2018), such as including visual schedules and work systems which have transferability (Macdonald et al., 2018). This, in conjunction with the employment of specific interventions, which are central to enacting inclusion (Lindsay et al., 2013), requires an acknowledgement of all learners' individual learning preferences (Majoko, 2013). Due to the uniqueness of ASD, general strategies such as active learning, direct teaching, cooperative learning, and independent learning cannot be overlooked, as they could provide an important starting point, although they may prove insufficient (Anglim, Prendeville, & Kinsella, 2018). This indicates the requirement of multiple strategies in a teacher's repertoire (Lindsay et al., 2013), enabling teachers to employ appropriate pedagogies to accommodate all learners, differentiating when required (Day & Prunty, 2015). However, Black-Hawkins & Florian (2012) state employing "something different" for individuals is a challenging and multifaceted pedagogical endeavour. This lack of knowledge about specific pedagogical approaches has definite consequences for teachers who wish to include learners with ASD in mainstream classes (Humphrey and Symes, 2013). This signifies the importance of ongoing upskilling to offer a range of pedagogical strategies (Striekera et al., 2011) as it is not a "one size fits all" (Young et al., 2017) and applies to all learners.

Upskilling Opportunities

For teachers to include all learners and meet the specific needs of learners with ASD, teachers require a wide range of skills and strategies (Morina 2020), signalling the requirement for continuous upskilling. The NCSE (2015) maintains that it continues to support appropriate educational interventions. This action is significant, as Lindsay et al. (2014) maintain that teachers require successful skills to employ strategies such as schedules, offering choice, visual supports and transition supports to include learners with ASD, due to the dyad of characteristics. Similarly, Oliver-Kerrigan et al. (2021) state that teachers require support with designing and implementing interventions to facilitate learning opportunities for learners with ASD. A coordinated approach by various agencies such as Education Centres, The NCSE, PDST and universities could address this by providing accredited online modules, open lectures and creating mentoring opportunities to support upskilling. While the NCSE (2019) provides upskilling opportunities for teachers aimed at learners with ASD, there appears to be a lack of awareness of or communication about the availability of courses or prioritising of such courses by teachers (Young et al., 2017). They maintain that while some teachers may be unaware of the availability of courses, the apparent lack of engagement may be due to competing priorities concerning upskilling such as new and modified curricula, addressing challenging behaviour, sensitivity towards gender, English as an additional language and the diversity of learners' needs in the classroom. Availing of targeted professional development could enable them to engage with an inclusive pedagogical approach, to develop skills and establish new practices (Lindsay et al., 2014).

Inclusive Pedagogy

This raises the question of what inclusive pedagogy looks like? According to Florian and Black-Hawkins (2011), inclusive pedagogy is an approach to teaching which accommodates all abilities in an inclusive classroom, that is not based on the choice of intervention but on how it supports all learners. They further maintain that when including everyone, it should be comparable to a learning community catering to all; the focus should be on what is taught instead of who. To achieve this Humphrey and Symes (2013) indicate a unified shared commitment from all school personnel is required, providing continuity when teaching all learners and, ultimately, removing variation in practice (Florian 2015). Some examples of such are providing a variety of avenues for learning, such as a structured routine, incorporation of visual supports, incorporating the child's interest to promote participation, whole class schedules, incorporating workstations and voice recordings, giving advance notice before transitions occur and utilising a total

communication approach, thus embodying an inclusive pedagogical approach to accommodate all learners (Morina, 2020).

THE RESEARCH STUDY

The research study explored, "How can teachers be supported to adopt an inclusive pedagogy for the education of pupils with ASD in a mainstream setting"? A single case study was employed to examine or confirm a theory or represent a case (Yin 2003), with the school in question constituting the case in this context. The case involved one rural primary school, accommodating 23 learners with ASD, 18 of whom attend three ASD-specific classes. The sample included all members of the teaching staff of 15, including an administrative principal. School policy indicates that teachers are rotated every three years, which means they may be placed in either a special class or a SET teaching position at some point in their careers.

An interpretivist perspective supported the research design, facilitating the participants to express individual viewpoints, opinions, and experiences. Both qualitative and quantitative approaches enabled the expression of alternative perspectives, gaining a more detailed overview (Denscombe 2010).

Structured interviews were utilised with the 15 participants, initially incorporating closed questions requiring numerical responses, which gleaned information such as age, experience and number of learners in their class. Participants were then asked a series of pre-prepared questions with pre-set response modes such as yes/no (Punch 2005). While open questions provided the space for knowledge, feelings, and actions to be detailed. The interview schedule incorporated 41 questions divided into three sections: section one incorporated dichotomous questions focusing on knowledge of inclusion. Section two included questions to gain participants' views and feelings on inclusion. Section three incorporated questions covering actions, upskilling, specific interventions, and differentiation. Each interview lasted twenty minutes and were audio-recorded to allow transcription at a later stage.

Ethical approval was sought and granted from a college ethics committee, and ethical considerations were adhered to throughout while informing participants of the aims and objectives of the study. Before commencing the study, approval was sought and granted from the Board of Management, and a formal letter was then given to the participants outlining ethical considerations and explaining what was

required of them. Explicit reference to voluntary participation was outlined and based on informed consent. On obtaining consent, participants were reminded that withdrawal at any stage was permissible.

Data received was analysed using two means: Quantitative data was coded to translate data into specific categories using the Statistical Package for Social Sciences (SPSS) programme. Qualitative data was obtained from all questions. An option for elaboration allowed participants to expand on their views if they wished, and data was analysed using thematic analysis. The transcripts were interpreted utilising Braun and Clarke's (2012) concept of thematic analysis. The data analysis was carried out in an inducive manner whereby objectives guide the analysis to allow research findings to emerge from different themes within the data (Azungah, 2018). The themes were formulated in conjunction with the themes which emerged from the review of literature and with participants' answers, which generated the findings.

A limitation of the study was the small sample. Due to this, the results could not be generalised to larger populations.

FINDINGS

Teachers' Understanding of the Concept and Practice of Inclusion

It was clear from the responses that inclusion as a concept lacked clarity, although participants viewed the principle of inclusion favourably, aligning with Shevlin et al. (2013). Participant H substantiated this view by indicating that "*every child learns at their own pace and style, and a separate education is not an equal education*". While participants indicated that inclusive practice was central in their classrooms, all practices could be considered inclusive due to individual interpretation (Messiou, 2017). Time and smaller classes were mitigating factors expressed by participants [n=12] impacting the enactment of successful inclusion, confirming the views Hastings and Logan's (2013) and Slee (2013). The impact of time and class constraints were outlined by Participant N, stating, "*You have to think of every child and tailor what you are doing to include everyone, and this can be challenging due to paperwork, workload and class size*". Interestingly, SETs, in this case, were not viewed as responsible for the education of learners with ASD, with mainstream teachers recognising their responsibility, which aligns with the views of Dunleavy (2015). This view was corroborated by Participant N, who indicated, *"if a child is in an inclusive setting, the class teacher is responsible for their education regardless of ability"*. While this view is encouraging, a unified understanding of inclusion was not evident,

and the need for school policy which values all learners' abilities and promotes inclusive practice.

Surprisingly, data obtained indicated inconsistencies on the presence of a policy on inclusion [n=8] were unsure, [n=3] said yes and 4 didn't respond, albeit no policy exists; which contributed to variation in practice. This contradicts the United Nations (2006) suggestion that policies are developed to support the implementation of inclusion. In this case, due to the lack of awareness of school policy on inclusion, there is no shared understanding of the aims and expectations of inclusion as outlined by Florian & Spratt (2013). This highlights the importance of foregrounding school policies in order to support a unified understanding of inclusion and implementation.

Teachers' Understanding of the Needs of Learners with ASD

The importance of knowledge and understanding about the specific needs of learners with ASD in an inclusive setting was overwhelmingly endorsed by participants, including recognising that individual traits impact inclusion. Participant E consolidated this view by indicating, *"I need to be aware of the needs of all learners including those who have ASD … all types of learners to teach them appropriately"*. However, a lack of upskilling to cater to the individuality of ASD was evident, confirming the assertions of Srivastava et al. (2017), indicating knowledge and understanding of this cohort is limited. The inclusion of learners with ASD was supported in principle by the majority of participants [n=14] while acknowledging the challenges of accommodating individuality, such as *"providing an appropriate environment to cater to the uniqueness of ASD"* (Participant C), aligning with Majoko (2016). These views, while generally positive, confirm Oliver- Kerrigan et al. (2021) stance that inclusion is not a reality for all learners with ASD due to unique presentation. This highlights the requirement for knowledge of ASD in order to understand the challenges these learners experience in mainstream classes (Barnhill, 2014). The increase in the prevalence of learners with ASD was confirmed in this case, corroborating Ravet's (2011) stance that teachers will have these learners in their class at some point and will have to teach them. This point was corroborated by Participant O *"I assume as the years go by, the number will keep increasing, and mainstream classes will have more learners with ASD"*. As school policy indicates staff rotation every three years, teachers will be placed in an SET position or a special class at various stages during their careers, which will involve explicitly teaching learners with ASD. These findings propose that a "specialist" pedagogy is required to teach learners with ASD. This has possible implications as there are 23 learners with ASD in the school, 18 of whom attend an ASD-specific class.

Challenges Identified by Teachers in Including Learners with ASD

Knowledge about Specific Pedagogies

The requirement of specific pedagogies to cater to the individual learning styles of learners with ASD was overwhelmingly acknowledged by participants aligning with Majoko (2013). All participants' views aligned with Lindsay et al. (2014) stance that teachers require multiple strategies in their repertoire to accommodate all learners. Interestingly, all participants stated that every child might require a specific intervention at some point. Although, as previously stated, the absence of upskilling has direct consequences on the employment of specific interventions. Participant C confirmed this point by indicating, *"for it to be successful, it should be seamless and well planned to address individual learners' needs. Therefore, upskilling is a necessity"*. Most participants [n=12] identified limitations in employing specific interventions as they have not received specific input. Participant G articulated these limitations stating, *"if you are including a child that, for example, uses TEACCH and you are not upskilled on this approach, everyone is at a disadvantage, especially the children"*. Therefore, teachers feel they lack requisite competencies confirming Rodden et al.'s (2019) stance. This has definite consequences for learners with ASD, confirming Humphrey and Symes (2013) view that the inclusion of these learners is complex and poorly understood due to the individuality of ASD. This highlights the necessity of upskilling as this will provide teachers with the knowledge to support learners with ASD.

Upskilling Opportunities

Surprisingly, the majority [n=12] of participants were aware of ASD upskilling opportunities. Participant K outlined the consensus of participants indicating, *"Yes, I am very aware, the principal emails the courses that are available"*. These findings contrast Young et al.'s (2017) stance that teachers lacked awareness of upskilling aimed at learners with ASD. To establish if ASD-specific upskilling was availed of, the findings were mixed, with four having none, two having in-service, four had a day course, and five classed their college training as sufficient upskilling. Overall, these findings indicate the lack of ongoing upskilling, illustrated by Participant F, *"by no means am I complete in my studies. I need more training",* despite the NCSE (2019) providing upskilling opportunities explicitly aimed at learners with ASD to support an inclusive pedagogical approach.

Inclusive Pedagogy

Participants overwhelmingly agreed that an inclusive pedagogical approach should accommodate all abilities (Black-Hawkins and Florian, 2011). This view was substantiated by Participant G, stating, *"it cannot be a one size fits all"*. The majority of participants [n=14] acknowledged that a learning environment

should include everyone learning together. Participant N sums up the consensus by indicating, *"I think today that there are so many different learners' styles, conditions that when you are planning a lesson when you are thinking of how you are going to teach. It becomes second nature now that you have to appeal to all learner styles whatever they are in the class",* aligning with the views of Black-Hawkins and Florian (2012). Various avenues for learning were deemed important by most participants (n=14). These sentiments were further supported by participant I who stated, *"I consider all learners, rather than writing they need to cut and paste. Those who need visuals, those who would be better to touch and feel things. Those who need more time, those who need more support and those who need more challenges".* These positive views show a commitment to inclusion, and a will to support the development of an inclusive pedagogical approach (Morina, 2020).

CONCLUSION

As previously noted, primary teachers' attitudes were examined, informed by a tripartite classification including cognitive, affective, and behavioural factors. Based on this framework, the following section outlines some of the components necessary to support the inclusion of learners with ASD in the school in question. A larger sample incorporating more geographical areas and settings is required to reflect countrywide teachers' attitudes.

The research supported the assertion that inclusion has different meanings to different people in different contexts, so gaining a unified understanding is challenging due to context, interpretation, and location (Lisaidou 2012). Although the participants' attitudes towards inclusion are encouraging, it could be concluded that for them, all practices could be viewed as inclusive due to varied individual interpretations. A unified interpretation of inclusion from the Department of Education and Skills (DES) could be achieved by providing an online national discussion forum for all stakeholders, including teachers, parents, agencies, academics, etc. As knowledge and understanding of learners with ASD may vary, the forum would require monitoring by DES officials who have expertise in inclusion and ASD. The platform would allow all views to be expressed and ultimately identify the gap between perceived knowledge and the actual knowledge of all, including teachers. These officials could advocate for all learners learning together, supporting implementation leading to a unified understanding of inclusion. Based on this information, in the absence of a unified understanding, the study school needs to adopt a definition of inclusion to support

enactment, identifying what inclusion looks like in their specific context. This should include classroom strategies agreed by all staff to support implementation.

A unified understanding would also support the development of a universal generic policy by the DES that can be amended to cater to each school's cohort. In the case of the school where the research took place, an inclusion policy is not yet in place. In the interim, further collaboration between school staff is required to develop an individual school policy that meets the standard of inclusion, with support from management to address this additional workload. This collaboration would allow all parties to be aware of the aims and expectations of inclusion, removing variation in practice. Participants' efforts to date need to be commended as the foundation of inclusive practice has been established without the guidance of a specific policy. This indicates that inclusion is viewed favourably, and that policy development should incorporate the shared understanding that in turn, could deliver a seamless enactment for all learners.

The absence of upskilling and further educational provision was a prominent feature throughout this study, despite most participants being aware of upskilling opportunities and despite the principal's efforts to communicate these opportunities. In the absence of upskilling, both at individual and whole-school levels, the inclusion of learners with ASD is in jeopardy. This could be addressed for this particular school by the principal sourcing and accessing whole school upskilling opportunities, thus providing continuity and promoting inclusive practice when including learners with ASD. These upskilling opportunities could be accessed from the NCSE and/or outreach courses available from universities to individual schools or school clusters.

Finally, I wish to acknowledge that this article represents part of a larger research project and as such is limited in scope. Through this research, I have gained a deeper insight into the complexity of inclusion. Rights underpin my interpretation of inclusion, as every child has a fundamental right to an appropriate education. However, I believe that small changes to teaching pedagogies and a unified school approach can make a big difference in improving inclusive practices and foregrounding the rights of the child.

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"A Different World" - Supporting Self-Efficacy Among Teachers Working in Special Classes for Autistic Pupils in Irish Primary Schools

Education provision for autistic pupils within the Irish education system has changed radically in recent decades. Autistic pupils now comprise 1.5% of the current Irish pupil population and the number of autistic pupils in receipt of Special Needs Assistance (SNA) support in mainstream schools increased by 83% in the five-year period between 2011 and 2016 (Campbell et al. 2017). This small-scale qualitative study seeks to examine the experiences and perspectives of principals and teachers working in special classes for autistic pupils across a range of Irish primary schools. Face-to-face, semi-structured interviews with 10 participants, 4 principals and 6 special class teachers, were conducted, facilitating a nuanced understanding of how autism classes operate across a sample of six Irish primary schools. In doing so, it seeks to identify some factors perceived to impact efficacy among teachers working in autism classes, as well as explore potential avenues that may support schools in building teacher capacity to foster inclusive provision. The findings of the study may have relevance in identifying the challenges faced by teachers working in autism classes in Ireland, signposting some avenues for addressing such challenges and building capacity within schools to ensure quality educational outcomes for autistic pupils.

Keywords**:** *Inclusive education, special classes, autism, teacher isolation, teacher wellbeing, self-efficacy*

CAITRÍONA EGAN is a primary school teacher in a co-educational Community National School in County Dublin. She has over 10 years' experience of working with autistic pupils in mainstream and special class settings, and completed a Masters in Special Educational Needs from Dublin City University (DCU). NEIL KENNY is a member of the School of Inclusive and Special Education at DCU's Institute of Education and is a Research Fellow at the National Anti-Bullying Research Centre. He is Programme Chair for the Master of Education in Autism at DCU.

Corresponding author: **neil.kenny@dcu.ie**

INTRODUCTION

Special classes form a significant part of the continuum of provision in Ireland, facilitating autistic pupils[1] to be educated alongside peers in their local mainstream schools (McCoy, Banks, Frawley, Watson, Shevlin, and Smyth, 2014; NCSE, 2011; Ware, Balfe, Butler, Day, Dupont, Harten, Farrell, McDaid, O' Riordan, Prunty, and Travers, 2009). Given the reality that special education developed over recent decades in Ireland largely in parallel to general education provision (Kenny, Mihut and McCoy, 2020, Shevlin and Banks, 2021), the use of special class provision for autistic learners has been centrally important in increasing their inclusion in mainstream schools (NCSE, 2016a andb; DES, 2020). This has aligned with the policy agenda since the 1990s, of movement from a largely segregated model for provision for autistic pupils to an inclusive model of education (NCSE, 2016b, Shevlin & Banks, 2021). A range of governmentally commissioned reports, from the Special Education Review Commission (SERC: 1993) report through to the National Council for Special Education (NCSE) funded reviews, such as the comprehensive review of special education supports in schools (NCSE, 2013) and the international reviews of the literature relevant to provision for autistic pupils (2009, 2016) have guided national policy increasingly towards inclusive provision. This movement has mirrored the international policy movement towards increasing education inclusion which has been greatly influenced by the UNCRC (1989) and the Salamanca Statement (UNESCO 1994). In contrast to deliberate and clear policy movement towards greater inclusion, there remains less detailed guidance regarding how schools are to operationalise inclusive modes of provision in practice (DES, 2020, Banks and McCoy, 2016). It has been suggested by some that, once opened, there is significant levels of diversity in how autism classes are incorporated within mainstream schools (Shevlin and Banks, 2021), with a traditional high level of autonomy in terms of how school govern such classes impacting levels of subsequent oversight from the DES (Marcus-Quinn, et al., 2019). While this autonomy may support a high level of flexibility and opportunities for differentiation of policy implementation in schools to meet pupil cohort needs, it may also lead to a lack of consistency or accountability (See DES, 2020 for example). A simultaneous lack of support or guidance for

[1] Within Irish educational research and practice, there is considerable debate around appropriate language. The prevalent diagnostic terminology of 'Autism Spectrum Disorder' may be perceived to carry negative implications of deficit labelling (Bottema-Beutel, Kapp, Lester, Sasson, & Hand, 2021). In the autism community, many self-advocates prefer the language of 'autism' or 'autistic person', understanding autism as an inherent and empowered part of one's unique identity (AsIAm, 2021). For this reason, this study has opted to utilize the terms 'autism classes' and 'autistic person', whilst recognising the discussion and sensitivity around the choice of language.

principals or teachers working in autism classes can exacerbate challenges for teachers working in such settings (Kenny, Mihut and McCoy, 2020). Indeed, little attention has been given to the experiences of teachers working in these settings or how such provision is implemented across schools within the Irish education system (Horan and Merrigan, 2019; Parsons et al., 2009). This is surprising given the emerging consensus on the importance of teacher characteristics, such as attitudes, wellbeing and self-efficacy, in supporting inclusive practice in schools (Hattie, 2009; Saloviita, 2015; Leyser, Zeiger, and Romi, 2015). Additionally, teachers working in autism classes are more likely to experience emotional exhaustion, low confidence, job disengagement, and personal failure for unsuccessful outcomes (Langher, Caputo, and Ricci, 2017). Current research exposes certain barriers that can impede practice within special classes, including perceptions of self-efficacy (Hosford and O'Sullivan, 2016; Horan and Merrigan, 2019; Shevlin, Winter and Flynn, 2012); teacher stress and isolation (Banks et al., 2016; Shevlin et al., 2012); access to training (Banks and McCoy., 2016; Dunleavy, 2015); insufficient supports for schools (NCSE, 2011; Parsons et al., 2009; Ware et al., 2009), and school leadership and culture (Dunleavy, 2015; Hosford and O' Sullivan, 2016).

The Role of Teachers

Studies identify the teacher as the key agent in ensuring quality educational outcomes for pupils with SEN (Forlin, Loreman, Sharma, and Earle, 2009; Shevlin, Winter, and Flynn, 2012; Ware, Balfe, Butler, Day, Dupont, Harten, Farrell, McDaid, O' Riordan, Prunty, and Travers, 2009). Teacher attitudes have been shown to be heavily influenced by self-evaluated levels of self-efficacy (Bandura, 2006; Hattie, 2009; Salovitta, 2015). Self-efficacy can be defined as the judgment of one's capability to execute a given type of performance (Bandura, 2006). A growing body of research emphasises the critical importance of teacher efficacy for inclusive education across settings (e.g. Almog and Shechtman, 2007; Leyser, Zeiger, and Romi, 2011; Malinen, Savolainen, and Xu, 2012; Romi and Leyser, 2006; Soodak, Podell, and Lehman, 1998).International studies investigate the relationship between teacher isolation and burnout (Kaff, 2004; Langher, Caputo, and Ricci, 2017; Schlichte, Yssel, and Merbler, 2010). In Ireland, Ware et al. (2009) argue that special class teachers can experience isolation from the wider school, as they feel solely responsible for pupils with the most significant levels of need. The complex and multifaceted nature of the special class setting, accompanied by the perception of isolation (Banks et al., 2016; Shevlin et al., 2012) and a lack of support reported by teachers (Banks et al., 2016; Dunleavy, 2015), can contribute to emotional exhaustion and low perceptions of self-efficacy (Anglim, Prendeville, and Kinsella, 2018; Langher, Caputo, and Ricci, 2017).

In addition, the perceived absence of adequate training and collegial support exacerbate experiences of stress and fatigue (Banks et al., 2016; Finlay, Kinsella, and Prendeville, 2019; Goodall, 2015; Shevlin et al., 2012). Such barriers can impact upon the wellbeing and capacity of teachers working in special classes, highlighting a disparity between principles of inclusion and enactment in practice (Day and Prunty, 2015; Dunleavy, 2015; Shevlin et al., 2012).

Teacher Education for Inclusive Practice

In response to prior concerns regarding limited appropriate content within preservice teacher education (Ware, Balfe, Butler, Day, Dupont, Harten, Farrell, McDaid, O' Riordan, Prunty, and Travers, 2009), Initial Teacher Education (ITE) programmes in Ireland were re-accredited in 2012, with the addition of mandatory content on inclusive education and a wider range of school placement experiences (NCSE, 2019). Newly qualified teachers (NQTs) who selected placements in a special school, special class, or special education role reported feeling better equipped to respond to diverse learners (NCSE, 2019). Nevertheless, Banks et al. (2016) report teacher dissatisfaction regarding the level of preparation prior to commencing work in special classes settings. Teachers highlight a lack of training for a multiplicity of responsibilities, including managing challenging behaviours, supporting pupils with complex needs, collaborating with parents, leading a team approach, and liaising with external professionals (Banks et al., 2016; Goodall, 2015; Kaff, 2015). One significant issue reported is the necessity for continued opportunities for professional development in inclusive education (NCSE, 2019).

Access to Continuous Professional Development

Irish and international studies advocate professional development in autism-specific methodologies (Banks et al., 2016; Lindsay, Proulx, Thomson and Scott, 2014; Ravet, 2011; Shevlin et al., 2012). Teachers need knowledge of autism to build trust and rapport with pupils, engage greater focus in lessons, reduce sensory and environmental triggers, effectively use visual supports, and minimise challenging behaviours (Goodall, 2015; Lindsay et al., 2014; Ravet, 2011). A number of Higher Education Institutions offer a range of specialist post-graduate programmes subsidized by the Department of Education for teachers working in situ as Special Education Teachers (SET) in different settings in Ireland. These more formal Continuous Professional Development (CPD) options offer detailed access to specialised teaching and planning approaches over year-long programmes. Further short courses and consultative support are available through the National Council of Special Education (NCSE), Cosán, and Middletown Centre for Autism.

Numerous limitations have, however, been identified regarding current CPD options available for teachers working with autistic pupils. With regards to formal, subsidized CPD, limited spaces on courses and availability of substitute cover can complicate access to training for teachers working in autism classes. For example, only 18 such places are available in the greater Dublin region. In the case of the more numerous short-course CPD, the short duration and content overload of day seminars can leave teachers feeling overwhelmed and disempowered. In the absence of sufficient training opportunities, teachers rely on a 'trial and error' approach, with commendable and flexible approaches in response to individual pupil needs (Anglim, Prendeville, and Kinsella, 2018). This can lead to uncertainty and self-doubt however, as decision-making is informed by experience rather than knowledge acquired from training and professional support (Anglim, Prendeville, and Kinsella, 2018; Finlay, Kinsella, and Prendeville, 2019). Recent Irish reports call for improved access to professional development and consultative support to alleviate experiences of stress and isolation in autism-class settings (Finlay, Kinsella, and Prendeville, 2019; NCSE, 2019). Consultation approaches and practical workshops are advocated, facilitating teachers to adapt strategies for their context (Dunleavy, 2015). According to Lindsay et al. (2014), optimal learning occurs through formal training and informal collaboration with experienced colleagues.

Collegial School Culture

Teachers' perception of collegial support can enhance confidence to enact meaningful pupil outcomes (Booth and Ainscow, 2002; Hosford and O' Sullivan, 2016; King, 2011). Supportive school cultures are characterised by positive leadership and collaborative practice (Ainscow and Sandhill, 2010; Hosford and O' Sullivan, 2016). Wider systemic factors can impede the realisation of inclusive practices however (Ainscow and Sandhill, 2010). Irish reports highlight the need for ongoing professional development for principals to lead effective whole-school approaches and special class provision (Banks et al., 2016; Ware et al., 2009). Dunleavy (2015) argues that collaborative practice in schools can be perfunctory and reactive, rather than planned and coordinated. Such arguments preclude any naive interpretation of developing collaborative cultures within schools, raising pertinent questions about current provision and support for teachers in special class settings. (Dunleavy, 2015; Shevlin et al., 2012).

This small-scale study sought to elicit the perspectives of principals and teachers working in special classes for autistic pupils across a range of Irish primary schools. It aimed to explore factors that may impact upon the wellbeing and efficacy of teachers working in autism classes, as well as avenues that might support schools

in building teacher capacity within autism classes. The study may have relevance in addressing such barriers, thereby strengthening teacher efficacy and enhancing positive outcomes for autistic pupils.

METHOD

Research Design

A qualitative design was adopted for this study, facilitating a context-driven and nuanced understanding of how autism classes operate across a sample of six Irish primary schools from the perspectives of those involved (Cresswell, 2013; Denzin and Lincoln, 2005; Seidman, 2006). Face-to-face semi-structured interviews with 10 participants, 4 principals and 6 special class teachers, were conducted.

Participants and Procedures

Purposive sampling (Guest, Bunce, and Johnson, 2006) was utilized, and criteria for inclusion were principals of mainstream primary schools with autism classes, and primary teachers currently working in autism classes. A representative cross-section of schools was selected, taking account of demographic variables of school patronage (1 Community National School/ 3 Roman Catholic National Schools/ 2 Educate Together National Schools), economic status (2 DEIS/ 4 non-DEIS), and gender profile (1 single sex/ 5 co-educational). Schools were recruited on a first-come, first-served basis. The size of the sample was determined by the scope of the study, time limitations, and estimated data saturation (Dworkin, 2012; Guest et al., 2006; Morse, 2000). The interviews were conducted in the participants' place of work and at a time that suited their schedules. Interviews were approximately 40 minutes in duration and were audio recorded using a dictaphone.

A thematic analysis (Braun and Clarke, 2006) of the interview data was conducted. Interviews were transcribed verbatim and manually coded by the researcher. Coded data extracts were categorised within primary themes and sub-themes. The validity of each theme was reviewed to ascertain if themes accurately reflected aspects of the full data set, and a coherent story of the data was generated. Vivid vignettes were selected to illustrate findings in relation to the central research inquiry (Braun and Clarke, 2006). Ethical approval was granted by the Faculty Ethics Review Panel for the Higher Education Institution. Schools were contacted by email, informing them of the research and inviting them to participate using a Plain Language Statement. Prior to each interview, informed written consent was obtained. Numerical codes and pseudonyms were employed to protect participant anonymity (Brinkmann and Kvale, 2015).Small sample size may impact the

generalisability of the research findings. This study seeks to give voice to the experiences of participating teachers and principals, but such context-driven perspectives may not be representative of all Irish primary schools.

FINDINGS AND DISCUSSION

Three themes emerged from the data within this study: Teacher wellbeing and role, Isolation and whole school approaches, and Lack of adequate preparation. The findings for each of these themes will now be discussed.

Teacher Wellbeing and Role

A complex picture emerged whereby the distinct challenges faced by teachers working in autism classes had potential negative impacts upon teacher wellbeing. Participants identified multiple demands, including supporting pupils with challenging behaviour, differentiating the curriculum, planning for inclusion, managing a team, continuous problem-solving, and collaborating with parents. Although teachers acknowledged the process of '*learning as you go'*, consistent with international and Irish research, risks of isolation and emotional exhaustion among special educators were reinforced by the findings of this study (Banks et al., 2016; Kaff, 2004; Langher, Caputo, and Ricci, 2017; Schlichte, Yssel, and Merbler, 2010; Ware et al., 2009).

> *You're trying to learn each of the children, so you can best help them [...] And then you're also trying to help the adults [...] You're teaching kids, teaching adults, teaching yourself, and it's overwhelming* (Sinéad Teacher A, Sch 5)

Despite evidence of experiential learning and reflective practice in response to pupil needs, participants expressed feelings of self-questioning and doubt (Anglim, Prendeville, and Kinsella, 2018; Finlay, Kinsella, and Prendeville, 2019), with one teacher commenting *"it was so new to me, I didn't really know what to expect […] What you're supposed to do."*, and another emphasising the impact upon her emotional and physical wellbeing. *"You learn as you go along. I came home most nights and I was […] a skeleton or as grey as could be."*

While principals acknowledged the key role of the teacher in ensuring successful outcomes for the autism class, one principal also noted, "*the isolation of staff teaching and working in the ASD class is something that really came to my attention early on, because it's a completely different job*". School leaders clearly found judging how to support SET staff working within autism classes a challenge, with some teachers commenting that their principal "*..was nearly down daily, because I*

was having such a hard time". A participating principal highlighted the limitations of such a role saying "*it's very difficult for school management to direct a teacher in what to do when they haven't been trained themselves*". This limitation was also echoed by a participating teacher who noted their school management were *"..very supportive on an emotional basis and on a resourcing basis. But .. they've never taught a class like this* [...]*Whereas the experience that we need and the support that we need is coming from a background in special ed*" (Kate, Teacher, School 1). In contrast, and consistent with Irish research, the findings of the current study emphasised the central role principals played in leading inclusive cultures (Ware et al., 2009; Banks and McCoy, 2016; DES, 2020). The necessity for provision of appropriate CPD opportunities related to whole school inclusion for principals is also clear in the current findings (Ware et al., 2009).

As the impact of teacher self-efficacy upon pupil outcomes has been well established (Hattie, 2009; Saloviita, 2015), it becomes paramount to investigate factors that impact upon teacher wellbeing in autism classes. In order to alleviate experiences of isolation and stress, barriers must be addressed and appropriate supports enhanced (Finlay, Kinsella, and Prendeville, 2019).

Isolation and Whole School Approaches

As indicated in the extant literature (DES, 2020; Kenny, Mihut and McCoy, 2019), school autonomy and the diversity in how schools operated special classes appeared to impact upon the perception of isolation among participating teachers in the current study. A recent Irish study highlights the wide disparity in how the curriculum is delivered across autism class settings, and challenges to mainstream access for pupils with greater need (Finlay, Kinsella, and Prendeville, 2019). Factors such as the complexity of needs within the class and the level of teacher experience were identified as being influential. In the current study, experiences of teacher isolation were more pronounced when working with pupils with more complex profiles, where individualised provision diverged significantly from the curriculum-led approach of mainstream settings. Indeed, Kate, a participating teacher in School One who had moved from a special school setting to teaching in an autism class in a mainstream school, said the emotional support from colleagues "*..was one of the biggest things I missed from moving from a special school*," where colleagues would "*know exactly what was going on"* if she was having a bad day, an understanding that may not be shared by colleagues in mainstream settings.

Echoing recent studies on the emotional experiences of teachers working in autism classes (Anglim, Prendeville, and Kinsella, 2018; Langher, Caputo, and

Ricci, 2017), teachers emphasised the importance of emotional support from colleagues, stating "*You're going to need to off-load […] to talk to people about things that happen during your day*". Teachers perceived that colleagues lacked an understanding of the work of autism classes and all reported experiences of isolation. One teacher commented that mainstream colleagues are "*unaware of what you have to do, because it's a totally different world*" (Helen, Teacher B, School 5). This concept of a "*different world*" impacted upon two fundamental aspects of collegial support—emotional support and collaborative planning. Langher, Caputo, and Ricci (2017) argue that feelings of isolation are reduced when teachers perceive to be supported by colleagues. One teacher commented on feeling *"isolated when you're the only ASD class teacher [...] you're the only one who's completely different from the rest"*.

By identifying barriers to emotional and practical support with schools, these findings foreclose any simplistic interpretation of how whole-school collaborative practices can be established and maintained (Dunleavy, 2015; Shevlin et al., 2012). Within this study, teachers echoed the necessity of consultation approaches, facilitating learning that is contextual, meaningful and practical (Dunleavy, 2015; Lindsay et al., 2014; Ware et al., 2009). However, while most participants reported being aware of strong collaborative cultures within their school, all participating teachers reported working in isolation to plan for their autistic pupils. This finding echoes recent research exploring the imbalance in inclusive collaboration within schools, with SET or teachers in special roles often taking significant burdens of planning to support inclusion for pupils with additional needs (Ni Bhroin and King, 2020). Half of the participants attended planning meetings with mainstream colleagues, but reported that such sessions were not beneficial due to the highly differentiated planning for a diversity of ages, levels, and needs within the autism class.

> *They're all working off the same curriculum and off the same book, so they can work together and they can problem-solve there [...]it's down to me in my class to plan for our kids, and no amount of collaboration can solve that* (Kate, Teacher, School 1).

All principals expressed the importance of supporting teachers in autism classes, identifying whole school approaches to enhance collegial support and problem-solving with one school implementing a '*consultation*' or '*referral*' procedure to flag concerns with a SEN team, and another utilising a '*debriefing*' procedure following challenging incidents, facilitating access to immediate support with a designated person. As advocated by Lindsay et al. (2014), this emphasizes formal professional CPD and ongoing informal collegial support for teachers in special

classes. Most teachers acknowledged the value of emotional support and expertise from experienced colleagues, yet described the challenges of developing whole-school approaches in the absence of autism-specific knowledge across the school. Teachers reported that they relied upon colleagues in other autism classes for collaborative problem-solving, practical strategies, and personal support.

Lack of Adequate Preparation

The findings of this study emphasised the perception of special classes as a "*different world*", necessitating preparation in autism-specific knowledge and approaches (Banks et al., 2016; Lindsay et al., 2014; Ravet, 2011; Shevlin et al., 2012). Consistent with Irish reports, teachers highlighted the importance of autism-specific methodologies in responding to pupil needs (Daly et al., 2016; Parsons et al., 2009). Teachers argued that such knowledge is essential to reduce triggers in the environment, to ensure the emotional wellbeing of pupils, and to tailor provision (Dunleavy, 2015; Ravet, 2011). These findings denote the need for specialised preparation and ongoing access to appropriate professional development for teachers working in autism classes (Finlay, Kinsella, and Prendeville, 2019; Dunleavy, 2015; Lindsay et al., 2014).

In the absence of autism-specific CPD prior to transitioning to special classes, many participants perceived an over-reliance on "*learning on site*." This finding echoes the findings of the recent DES Inspectorate report that was critical of the appointment of newly qualified teachers to posts in autism classes without additional CPD (DES, 2020). One newly appointed teacher expressed feelings of inadequacy over her '*failure*' to achieve curricular outcomes. Another teacher recalled her realisation that her expectation of implementing a mainstream curriculum did not correspond to the developmental level of her pupils at this time. Teachers reported greater confidence in meeting the demands of the role as their experience of working in the autism class developed. Teachers adopted "*a more relaxed approach*", learning to "*go with what's a priority*" in setting pupil-centred targets rather than striving to meet the demands of a mainstream curriculum. This echoes recent Irish reports on the admirable use of creative approaches gleaned from experiential learning in response to individual pupil needs (NCSE, 2016; DES, 2020; Anglim, Prendeville, and Kinsella, 2018). Participants advocated for the necessity for distinct curricula and individualised targets in response to learner needs. The importance of individualised planning, alongside the over-reliance on 'learning as you go' however, can further distance teachers from mainstream colleagues and exacerbate experiences of isolation and stress (Finlay, Kinsella, and Prendeville, 2019).

These findings have implications for how supports might be enhanced to foster teacher capacity within autism classes. Participants recommended an "*ongoing consultation approach in schools",* facilitating focused training to address specific needs in context. Emergent collaborative practices were in evidence in this study, providing avenues of support for teachers in autism class settings. Pertinent challenges in establishing collaborative practice within schools were raised however, highlighting the need for increased attention in addressing challenges.

CONCLUSION

This study identified some factors that can impact upon teacher wellbeing and signposted some potential avenues to enhance supports for teachers working in autism classes. The wellbeing of teachers working in specialised settings is paramount to ensure successful outcomes for autistic pupils. Factors contributing to teacher isolation and stress must be investigated and urgently addressed. Internal school factors such as leadership and the development of collaborative learning communities within schools can facilitate greater access to practical and emotional supports for teachers. Access to pre-service and ongoing professional development for special class teachers, principals, and mainstream colleagues can empower schools to develop such professional learning communities enabling the emergence of supportive whole-school environments. However, such professional development must be coordinated in consultation with schools to best support teachers within special classes and ensure optimal provision for autistic pupils.

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Maths Textbooks and Inclusive Practices in the Teaching of Maths in the Senior Classes of Primary Schools in Ireland

This article reports the findings from a small-scale study that sought the opinions of both class teachers (CTs) and special education teachers (SETs) on the use of maths textbooks as a teaching tool in 4th, 5th and 6th classes in Irish primary schools, and what inclusive practices are being used by teachers to support pupils with learning difficulties in maths. The majority of teachers in the study agreed with the use of the textbook for teaching maths in the senior classes of primary school and viewed it as an important tool influencing planning, teaching methods and teaching practices.The study drew attention to how textbooks can focus teachers and pupils on achieving accuracy rather than focusing on the process of maths and can greatly influence teachers in adopting a traditional teacher-led approach to teaching maths. Also, despite good intentions exclusive rather than inclusive practices are being used by most teachers in the study to support pupils with maths. Emerging from the findings is the need for textbook analysis and teacher professional development (PD) in order to change and improve the mindset, approaches and teaching of maths for all pupils.

Keywords: *maths teaching practices, maths textbook, primary senior classes, inclusion, additional support*

MICHELE DUFFY is a special education teacher in a senior primary school in Co. Louth with a Masters in Special Educational Needs from Dublin City University (DCU). CATHERINE BRENNAN is a primary school special education teacher and part time tutor at the School of Inclusive and Special Education, Dublin City University Institute of Education.

Corresponding author: *michelle.duffy55@mail.dcu.ie*

INTRODUCTION

The draft of the new Primary Maths Curriculum (PMC) is advocating a constructivist, social approach to teaching and learning (National Council for Curriculum and Assessment (NCCA), 2018). Research has shown that the Irish

primary maths curriculum is generally communicated by teachers in a large number of Irish primary classrooms through textbooks (Department of Education and Science (DES), 2005; Eivers et al., 2010; Kavanagh et al., 2015; NCCA, 2016). However, Shield and Dole (2013) question whether the textbook facilitates "the development of deep learning of mathematics" (p.183) which would be needed to achieve this reform in maths education.

The purpose of this study was to examine the current maths teaching practices and the use of the maths textbook by class teachers (CTs) and special education teachers (SETs) in primary school senior classes. The study focused on the extent to which textbooks are used by CTs and SETs; their opinions of textbooks as a teaching tool; and what the influences and motivations are behind using the textbook. With inclusion also having a central role in the PMC, the study also focused on the types of inclusive practices used by the CTs and SETs in the senior classes of primary school to support pupils with learning difficulties in maths. Inclusion here was examined in relation to using the textbook, differentiation, team teaching and additional support. Teacher attitudes to teaching maths were also examined.

LITERATURE REVIEW

There is a wealth of research on ways to teach and learn maths. However, Boaler (2015) believes that this research is "not getting to teachers or being used in classrooms" (p. xvi). According to Dooley (2019) in order to bring about change in the maths curriculum "a different conceptualisation of what mathematics is and what it means to do mathematics is required at school and societal level" (p. 25). The skills needed for our future workforce are changing. These skills include problem solving, critical thinking, innovation, communication and collaboration as well as developing the traits of creativity, leadership, perseverance and adaptability (World Economic Forum, 2020). All of these are skills used by mathematicians.

The Teaching of Maths

The traditional approach to teaching maths essentially involves teachers showing students mathematical procedures and strategies with students practicing the procedures over and over again to develop accuracy. The student doesn't necessarily conceptually understand the mathematical thinking behind the procedures but is quite ready to memorize formulae and sets of rules to produce a high volume of work, individually aiming to get answers correct (Boaler, 2015; Civil, 2002, Geary, 1994). Research by Kikas, Peets and Hodges (2014) found

that for some pupils, this teacher-directed form of learning can inhibit intellectual development and negatively affect learning-related behaviour, such as persistence, taking risks, and perceptions of competence and effort. On the other hand, they found that a teacher-directed approach can positively influence basic skills development through a drill and practice approach, especially in children with low academic attainment or with difficulties working persistently on new and challenging tasks (Kikas, Peets & Hodges, 2014).

A different approach to teaching and learning of maths has a more child-centred focus. Here the pupils are active learners constructing mathematical knowledge for themselves through investigation and discovery learning (Boaler, 2015; Civil, 2002; Geary, 1994). Pupils are encouraged to use concrete materials with an effective strategy to aid this Concrete-Representational-Abstract (CRA) approach (Witzel, Riccomini & Schneider, 2008). Here pupils are explicitly taught maths following the three steps of firstly using concrete materials, then using representations through pictures or drawings and finishing by applying their knowledge abstractly (Gibbs, Hinton & Flores, 2018). This is the approach to mathematics that the new PMC is promoting, emphasising the social and collaborative nature of maths (NCCA, 2016). Critics of a child-centred approach question whether pupils have the capabilities to learn maths through discovery without having a strong mathematical grounding (Geary, 1994). However, Pakarinen and Kikas (2019) found that child-centred teaching practices should be encouraged, especially in the junior end of primary school, as these classrooms enhanced the learning of maths skills in pupils compared to teachers using a more didactic approach.

Introducing change to maths instruction can be difficult. Small (2017) points out that "initially, students who are accustomed to highly structured learning environments may find open questions or choice unsettling" (p. 15). Additionally, trying to provide an inclusive learning environment with the diverse range of abilities in classrooms can prove to be intimidating for teachers (Lovin, Kyger & Allsopp, 2004). Irish studies by NicMhuirí (2012) and O'Shea and Leavy (2013) found that traditional maths instruction was commonplace, with teachers finding it difficult to move from a didactic to a more facilitative approach. On the other hand, Hudson, Henderson and Hudson (2015) conducted action research into "teachers' confidence, competence, attitudes and beliefs in relation to mathematics" (p.374) within the context of the Scottish Curriculum, with findings showing that teachers were willing to transform their teaching and methods in line with the constructivist view of teaching maths. In an Irish context, Treacy (2017) also found that there were shifts in practice to a reform approach to mathematics teaching when participants engaged in effective professional development (PD). Schoenfeld

(2004) believes that a combination of both traditional and reform teaching in maths needs to be taken as "an exclusive focus on basics leaves students without the understandings that enable them to use mathematics effectively. A focus on "process" without attention to skills deprives students of the tools they need for fluid, competent performance" (p. 280-281). Hence, maths textbooks should strive to equally represent the importance of both skills and process (Vincent & Stacey, 2008).

The Textbook

For a very long time, textbooks have been used as supporting materials for the teaching and learning of maths. A comprehensive study of textbooks by Fan, Zhu and Miao (2013) shows that textbooks have an important role in the maths classroom. The main purpose of the textbook is to convey the national curriculum. However, despite covering the same maths curriculum, textbooks can differ in content and how they portray the content (Usiskin, 2013). How teachers use the textbook also varies (Mili & Winch, 2019). Remillard (2000) found that teachers differ in how they interpret and understand what the textbook presents, which in turn influences how they teach the curriculum. A reliance on the textbook can further lead to what Bernstein (1971) as cited in Macintyre and Hamilton (2010) calls a "framing" of the curriculum whereby teachers accept that the textbook is the curriculum that has to be taught.

In the Irish context, reported benefits for teachers using the textbook include coping with multiclass situations and large groups of children, guidance for applying the curriculum strands and strand units, and providing a range of exercises to consolidate learning (Dunphy, 2009; Harbison, 2009). Reported drawbacks of using textbooks is the tendency of teachers to over-rely on the books with the development of a "textbook-centred pedagogy rather than a child-centred one" (Dunphy, 2009, p.120). However, this doesn't need to be the case. The Netherlands follows the child-centred Realistic Mathematics Education (RME).To facilitate this approach the textbooks underwent a transformation away from the "traditional, mechanistic approach" towards "reform-orientated textbooks" (Van den Heuvel-Panhuizen & Drijvers, 2020, p.524). When textbooks were designed using the RME approach research by Alim et al., (2021) found that students' learning motivation was increased.

Effective Inclusion

Important factors determining the success of inclusion are teachers' practices, teacher attitudes and accessible and flexible curricula (Winter & O'Raw, 2010).

However, with a diverse range of abilities in classrooms, teaching inclusively can be quite intimidating and overwhelming for teachers, especially when teaching maths (Lovin, Kyger & Allsopp, 2004). Teachers feel they haven't been trained fully to teach in inclusive classrooms (Walton & Moonsamy, 2015).

Collaboration and co-teaching have been identified as effective in promoting inclusion (Engelbrecht, 2013; Lindsay, 2007). However, Travers (2011) found that the withdrawal of pupils from class was still a much-used option. Mulholland and O'Connor (2016) found that despite an awareness of the value of collaboration, its implementation is "largely aspirational" (p.1070). Differentiated instruction has been highlighted as providing opportunities for pupils with special educational needs (SEN) to be active participants and in promoting a sense of inclusion (Rose et al., 2015). Here pupils can participate through open-ended and parallel tasks within the pupil's "zone of proximal development", a term used by Vygotsky (1978, p.86) where pupils work between an independent level and a level of potential development through teacher or peer guidance (Small, 2017). In order to achieve this, teachers need to individualize instruction by removing specific barriers, structuring the environment, providing more time and practice, and providing clarity of instruction (Karp & Howell, 2004).

Inclusive pedagogy "rejects ability labelling, as a fundamental premise" (Florian & Spratt, 2013, p.121). However, ability grouping is adopted by many schools to deal with the challenges that teachers face when trying to deal with the diversity in their classrooms when teaching maths (Cheeseman & Klooger, 2018). Taylor et al. (2017) found that teachers are reluctant to use mixed attainment groupings in maths because managing students with similar abilities helps deal with the range of mathematical knowledge and improve learning outcomes. This is disputed by Clarke and Clarke (2008) and Boaler (2015) who claim that there are no academic benefits to ability grouping and that students can have negative beliefs of themselves as mathematical thinkers. In challenging the idea of fixed ability Hart et al. (2004) developed the Learning without Limits framework which is based on successful classroom practices used by teachers with the aim to change the mindset of teachers to promote inclusive practices. This framework advocates that there is always potential for change in achievement through transformability and by following the three principles: everybody, trust and co-agency, the learning capacity of all pupils is enhanced and pupils can become more effective learners (Hart & Drummond, 2014). By adopting an inclusive pedagogical approach, diversity is welcomed and it fosters an open-ended view of each child's potential to learn (Florian & Spratt, 2013).

METHODOLOGY

Research on textbooks has mostly been done with the lower-class levels in Ireland. Hence, the population of interest was all 4th, 5th and 6th class mainstream teachers and SETs supporting these classes with numeracy. Due to the convenience of the researcher's location, a purposive sample from the North East region of the Republic of Ireland was chosen for the research which represents about 10% of the primary schools in the country.

Design

This research study utilised an explanatory, sequential mixed methods research design (Creswell, 2012) consisting of questionnaires and semi-structured interviews. Two online questionnaires were designed, one for CTs and the other for SETs. The questionnaires were divided into three sections to include background information about participants' schools, inclusion of Pupils with SEN in Maths, and textbooks.

There were 37 questions on each questionnaire with many similar questions on both questionnaires (Appendix 1). The questionnaire took between 10-15 minutes to complete with the option of taking part in a semi-structured interview at a later date. The questionnaires helped to provide a general picture from the sample participants.

Following analysis of the questionnaire data, interview schedules (Appendix 2) were devised for questionnaire participants who expressed an interest in further sharing their opinions through a semi-structured interview. A more in-depth picture on textbook use and inclusive practices was sought.

Due to COVID restrictions, the interviews were conducted using Zoom at a time convenient to the interviewees. By acquiring and combining the different results it was felt that a better understanding of the research questions would be obtained. Approval for this research was granted by Dublin City University's (DCU) Faculty Ethics Review Panel and the standard procedures for the ethical conduct of research were observed.

Procedure

An email was sent to all principals in the North East region asking them to forward the online questionnaire link to the appropriate teachers. No identifier was used to allow for anonymity of the participants. The emails were sent during COVID school closures and whilst teachers were returning to online teaching. Two further

follow-up emails were sent to try and increase the response rate. Out of a possible 1095 CTs and 212 SETs, only 53 CTs and 24 SETs completed the questionnaires with one CT and one SET expressing an interest in the interview stage. The response rate for the questionnaires was poor, and could possibly be attributed to teachers working from home during national lockdown and the reliance on principals forwarding on the email. This is a limitation of the research as the findings cannot be generalised nationally. However, those who did participate did so because they felt strongly about textbook usage and their opinions and thoughts about textbooks and inclusive practices in senior primary school classes helps give some insight to current maths teaching in Ireland. One CT and one SET took part in the interviews. The CT interviewee will be denoted as CTI and the SET interviewee will be denoted as SETI. CTI has ten years' experience teaching a range of senior classes in a large urban school with mostly single classes. SETI has thirteen years' experience teaching a range of middle level single and multi-grade classes in a small, rural school. Both teachers expressed that they like teaching maths. Once the interviews were transcribed and verified by the participants, a thematic approach (Braun & Clarke, 2006) was used to analyse the data. The data was first separated into the two subject areas of the research questions, namely textbooks and inclusion. The data was coded with two over-arching themes emerging: textbook influence on teaching practices and exclusion rather than inclusion.

FINDINGS

The findings from the research were used to address the following research questions:

> *What are the opinions of CTs and SETs about using maths textbooks as a teaching tool in 4th, 5th and 6th classes?*

52 out of 53 CTs followed a maths textbook scheme with pupils buying or renting between one to four textbooks / workbooks for maths. The majority of CTs (87%) and SETs (67%) viewed the textbook as an important teaching tool with half of the questionnaire participants agreeing that the textbook is an excellent teaching aid. The textbook was used by 79% of CTs and 54% of SETs always or most of the time. This coincides with findings from Fan et al., (2013) whose study indicated that textbooks have an important role in maths classrooms.

The majority of teachers from the study (68%) were satisfied with the textbooks. 42% of questionnaire CTs use the yearly scheme supplied by the textbook as

their first preference in writing up their yearly scheme in maths. The interviewees pointed out that the textbook aids teachers with lesson organisation, pace of work, assessment of and for learning, and helping to anchor a lesson. They said that the textbook is used for planning, homework, differentiation and independent work. Similar benefits to using the textbook in the junior classes were found by Dunphy (2009) and Harbison (2009). Possible misgivings in using textbooks indicated by CTs, SETs and interviewees included the amount of calculations and number work to be done. Textbooks did not cover the needs of all pupils and were believed to move through topics too quickly.

CTI claimed that the textbook "has made my teaching more pen and paper based then exploratory." Both interviewees highlighted that concrete materials weren't really being used to teach maths in the senior classes with 38% of questionnaire SETs also agreeing about insufficient use of concrete materials. Both interviewees felt that the textbooks were "number heavy" with number represented in textbooks as learning off processes and doing calculation work. SET believed that textbooks prioritise algorithms like long multiplication instead of focusing on other strands such as measure, time and money. This sentiment was expressed by other SETs from the questionnaires. A SET from the questionnaire believes that there is "far too much practice without increasing the levels of difficulty or problem solving". Textbooks treating problem solving as repetitive low procedural activities was prevalent in the literature (Fan & Zhu, 2007; Schoenfeld, 2004; Vincent & Stacey, 2008). These are the opinions and interpretations of textbooks made by the study's participants which Remillard (2000) highlighted can in turn influence how the teachers teach the curriculum. However, Usiskin (2013) questions whether the textbook can be blamed for lack of learning and that "fidelity of implementation" (p.717) needs to be examined to see how much content from the textbook is actually being taught by teachers and how true to teaching the content teachers are.

CTI highlighted how textbooks tend to focus teachers and pupils on the answer. This view of maths as right or wrong has been CTI's experience of maths in school and in turn affects how they teach maths now. This reflects the views of Schoenfeld (2013), who found that teachers tend to teach how they've been taught themselves. The opposite opinion was expressed by the questionnaire participants. The majority (61%) disagreed that they mostly teach the way they were taught at school and the majority (74%) also disagreed that maths is about getting the answer right. However, questionnaire participants ranked ticking sums right or wrong as their second preference after teacher observation when giving feedback to pupils. This contradicts their views on maths being about getting answers right.

Both interviewees pointed out the number of calculations and sums pupils have to do from the textbooks. This in turn places an emphasis on maths as a performance subject. Boaler (2015) believes there should be a move away from this with a move instead towards lessons that "are filled with open-ended tasks that include space for learning as well as space for struggle and growth" (p. xxi).

A difficulty that teachers in senior classes have to contend with is a sense of negativity about maths that CTI believes stems from getting answers wrong in textbooks with the emphasis placed on achievement. CTI also found pupils would rather pretend they got answers right than try to figure out how to do the sums. CTI spoke about how pupils in senior classes have developed a dislike of maths often citing that work is impossible. This negativity was found by Boaler (2002) in her research on the traditional teaching of maths in Amber Hill School.

Usiskin (2013) wondered about the future of textbooks with the rise of electronic devices and technology. However, despite the list of negatives regarding textbooks, just over half of teachers in the study (52%) disagreed that textbooks were outdated and should be replaced by online interactive programmes. The majority of teachers from the study (83%) revealed they would be confident teaching without a textbook. Yet despite this confidence, only 6% expressed an interest in not using the textbook when the new PMC is implemented in schools. While there appears to be a willingness by teachers to change practices, which was also found by Treacy (2017), there also appears to be a difficulty moving from the teacher-led approach using textbooks to a more social, constructivist approach. This was also found in the Irish studies by NicMhuirí (2012) and O'Shea and Leavy (2013). While an aim of the new PMC may be to change the approach to teaching maths (NCCA, 2016), this doesn't necessarily mean that textbooks need to be abandoned. However, they may have to undergo a transformation which textbooks in the Netherlands did when following the Realistic Mathematics Education (RME) approach to maths (Van den Heuvel-Panhuizen & Drijvers, 2020).

What inclusive teaching practices are currently being used by CTs and SETs to support inclusion of students with SEN in maths lessons?
Winter and O'Raw (2010) listed important factors influencing the success of inclusion as teachers' practices, teacher attitudes and accessible and flexible curricula. This study examined inclusion in relation to teacher use of the textbook, additional support, team teaching and attitudes to teaching maths.

The majority of teachers surveyed (83.9%) agreed that the textbook caters for the average child. The majority (62.7%) also agreed that teachers tend to teach what's

in the textbook rather than starting where the pupils are at with 73.7% agreeing that there is a lack of content repetition to support pupils with SEN. For inclusion to take place, however, teaching towards the average child should be discouraged (Florian, 2014; Winter & O'Raw, 2010).

As SETI pointed out, there tends to be at least one pupil in each class that finds working at class level textbooks too difficult. To deal with this, teachers from the study chose textbooks at a more appropriate level, differentiated by organising other photocopiable sheets of work or provided additional support through withdrawal with SETs. Reasons given for doing this were:

- it allows pupils to manage tasks at their own pace with a sense of achievement;
- pupils are more focused and more willing to ask questions;
- less distraction; and
- pupils get more attention and time.

Unfortunately, adopting these practices does not lead to inclusion but instead highlights the differences in pupils and can lead to marginalisation (Florian & Spratt, 2013). Inclusive pedagogy is not about whole class teaching and then providing additional or different provisions for those students identified with SEN (Florian, 2010). The most popular form of differentiation used by CTs and SETs was by the amount of work done by pupils (92.2%). Differentiation by outcome was the least used form of differentiation among the questionnaire participants (44.2%), yet Rose et al. (2015) pointed out that it provides opportunities for pupils with SEN to be active participants and promotes a sense of inclusion.

The majority of CTs (66%) and SETs (79%) said they collaborate on a daily or weekly basis and overall, the level of satisfaction with collaboration by both CTs (79%) and SETs (83%) was positive. Reasons given for the positivity indicated by SETs were that it allowed for "sharing teaching strategies" and "both teachers use the same approach, methodologies and language." This reflects the findings of Mulholland and O'Connor (2016) who found that teachers are increasingly aware of the value of collaboration.The majority of CTs (83%) and SETs (95.8%) use at least one form of team teaching. Station Teaching and Lead and Support are the two most popular forms of team teaching being used by CTs and SETs. CTI gave an insight into doing station teaching for Maths Power Hour. CTI revealed that groups were created according to ability, no textbooks were used and both teachers and pupils really enjoyed this form of teaching. The class did this twice a week for six weeks of the school year, with the rest of the time spent with the textbook

and whole class teaching. SETI said their school was slow to adopt team teaching approaches with withdrawal of pupils for support the preferred practice. On the surface, team teaching appears to be used in schools but the interviewees helped highlight that the quality of team teaching needs to be examined further which coincides with findings from Mullholland and O'Connor (2016).

The questionnaire participants pointed out that additional support in maths of pupils with SEN was provided by withdrawal (30%), in-class support (17%) or a mixture of both (49%). Withdrawal appeared the preferred option used by SETs always or most of the time (58%). Half of the SETs indicated that they support other pupils in the class whilst providing in-class support to pupils with SEN. When asked which type of additional support they prefer, 25% of SETs prefer withdrawal whilst the remaining 75% prefer a mixture of both withdrawal and in-class support. Withdrawal tends to be used if pupils are at a much lower level than the class or if they need more focused teaching on a specific topic.

Table 1: Reasons for Withdrawal Support

• COVID safety procedures • Mathematics anxiety in pupils • Teacher preference • Too much class noise	• Allows for better concentration • Ability grouping • Small classrooms • SETs can devote more time to needs of pupils with SEN

Reasons for in-class support tended to focus on school policy, inclusion and keeping with the same maths topic as the class. Teachers used a mixture of withdrawal and in-class support for a number of reasons:

- Pupils can work at their own pace.
- Gaps in their knowledge can be supported.
- Class topics can be pre-taught.
- There can be consolidation of what was learned during class time.

The in-class support was used for certain topic areas in maths or for station teaching. Similar findings about using withdrawal were found by Travers (2011). Winter and O'Raw (2010) point out that if an inclusive pedagogical approach is to be taken, support through withdrawal from the mainstream class should be no longer seen as the default response to pupils with SEN which appears to be the case shown in this study.

Ability grouping is a regular feature in about a quarter of all classrooms with only 15% of CTs and 4% of SETs never using ability grouping in their classroom. CTI believed that putting pupils into ability groups meant the work could be differentiated more easily and at an appropriate level. This was also the thinking of teachers in the study conducted by Cheeseman and Klooger (2018). The inclusive pedagogy, Learning without Limits (Hart et al., 2004), discourages putting pupils into ability groups as fixed-ability learning can have negative effects on pupils, teachers and the curriculum and can highlight differences and widen the gap between the high and low achievers (Hart & Drummond, 2014). Interestingly, 16% of all teachers thought that only some people are good at maths, highlighting the fixed mindset that a percentage of the teachers hold. Boaler (2016) points out that these unintended negative messages can have an adverse effect on students.

CONCLUSION

This study has helped show that the prevalence of textbook use for the teaching of maths in the senior classes should be acknowledged. The majority of teachers in the study agreed with the use of the textbook and viewed it as an important tool in the teaching of maths. The study highlighted the extent to which the textbook influences how teachers approach the teaching of maths; how they use the textbook to structure their lessons; what they focus on in maths; and how they differentiate for pupils. The study drew attention to how textbooks can focus teachers and pupils on achieving accuracy rather than focusing on the process of maths. This in turn emphasises maths as a performance subject rather than a learning subject. This can create a sense of maths anxiety emphasising getting answers right and leading pupils to having a negative view of doing maths. The study showed that textbooks can influence teachers in adopting a traditional teacher-led approach to teaching maths.

Eivers et al. (2010) points out that textbooks were largely unexamined in Ireland. With this current study showing the widespread use of textbooks and the reluctance of a sizeable cohort of participants to teach without textbooks, a more in-depth examination of textbook content and the teaching style it promotes would need to be carried out. Further studies on how teachers teach maths with the textbook would also show the "fidelity of implementation" (Usiskin, 2013, p.717).

The teachers in the study believed they were using inclusionary practices in the teaching of maths. However, the use of lower-class textbooks for pupils with

SEN, the types of differentiation used, a preference for withdrawal and using ability grouping in team teaching tends to favour *exclusive* rather than *inclusive* practices. The study has shown that there are moves in the right direction for teacher collaboration, team teaching and providing in-class support. However, there appears to be a lack of understanding of the philosophy of inclusion and how to implement inclusive pedagogies. Inclusive practices welcome diversity and the view that all children have the capacity to learn. They involve providing a range of choices that are available to all learners rather than a set of differentiated options for some (Florian, 2010; Florian & Spratt, 2013).

The findings from this study have many implications for teachers, schools, the roll out of the new PMC, PD, textbook providers and the NCCA. For the roll out of the new PMC to be successful, the role and content of the textbook needs to be analysed with a transformation that aids the social, constructivist approach to teaching maths. Timperley et al., (2008) point out that consistent PD in a supportive, learning environment needs to take place to allow for change. Schools should be given the opportunity to self-evaluate their current maths practices and textbook use to teach maths as well as their understanding of inclusive pedagogies. On the surface, teacher led approaches to teaching maths appear to be working (Boaler, 2015; Schoenfeld, 1998), but these approaches can lead to exclusionary practices being adopted for some pupils and pupils developing a negative attitude towards maths. Schools need to understand the long-term benefits for all pupils of fully adopting the social, constructivist approach (Dooley, 2019).

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APPENDIX 1: QUESTIONNAIRE FOR CLASS TEACHERS

(1) Background Information – You and Your School

1) Are you? Male ❑ Female ❑ Prefer not to say ❑
2) How long have you been teaching?
   1-10 years ❑ 11 – 20 years ❑ 21 - 30 years ❑ 31 – 40 years ❑
3) Which class / classes do you currently teach?
   Single Grade: 4th ❑ 5th ❑ 6th ❑ Multi Grade ❑
4) Have you completed any additional third level study in the area of Mathematics?
   Yes ❑ No ❑
5) Have you completed any professional development courses in Mathematics during your teaching career? Yes ❑ No ❑
6) Is your school a) a junior school? b) a senior school? c) all classes?
   d) other ___
7) Is your school a) single-sex boys? b) single-sex girls? c) co-educational?
8) In what setting is your school? Urban / Rural
9) Is your school in an area designated as disadvantaged?
10) How many pupils in your school?

(2) Inclusion of pupils with SEN in Maths

11) How many pupils in your class have a Class or School Support Plan for Mathematics?

12) How many of these pupils have low incidence Special Educational Needs?
_____

13) How many of these pupils have high incidence Special Educational Needs?
_____

14) A. How do pupils get additional support for Mathematics?
Withdrawal ❑ In-class support ❑ Mixture of both ❑ Other ❑ _____
B. Can you explain why this method is chosen?

15) Which forms of team teaching do you use to support the teaching of Mathematics in your class?
A) Please tick those that apply in the first column
B) Please rank the main 2, with 1 = main criteria

	APPLY	RANK
Station Teaching		
Parallel Teaching		
Lead and Support Teaching		
Alternative Teaching		
Other (Please state) _____		

We don't use any form of team teaching in Mathematics ❑

16) How often would you collaborate on planning with the SET assisting your class?
Daily ❑ Weekly ❑ Fortnightly ❑ Monthly ❑ Termly ❑ Yearly ❑ Never ❑

17) How satisfied are you with arrangements of collaboration with SET in your class?
Very dissatisfied ❑ Dissatisfied ❑ Somewhat satisfied ❑
Satisfied ❑ Very Satisfied ❑

18) Do the pupils with SEN use the same Maths textbook as the rest of the class?
Yes ❑ No ❑ Sometimes ❑

If no or sometimes, can you explain why: _____
_____
_____

19) Do you group pupils in your class according to ability during Maths lessons?

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

20) Do you use the textbook as a tool for allowing some students work independently while additional help is provided to others?

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

21) Which approaches of differentiation do you use in the teaching of Maths?
Differentiate Maths Content (what pupil needs to know)

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

Differentiate Process (how you teach pupils)

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

Differentiate Product (amount of work that needs to be done by pupils)

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

22) Have you ever used any of these Early Intervention Maths programmes?
(Tick all that apply)
Maths Recovery ❑ Ready, Set, Go Maths ❑ Mata sa Rang ❑
Number Talks ❑ Other ❑

23) What methods of Maths assessment do you use?

A) Please tick those that apply in the first column

B) Please rank the main 3, with 1 = main assessment tool used

	APPLY	RANK
Conferencing with pupil		
Copy / Workbook Assessment		
Concept mapping		
Questioning		
Teacher Observation		
Teacher designed tests		
Maths Scheme Supplied Tests		
Standardised Tests		
Pupil Self Check		

24) How do you provide feedback to pupils?

A) Please tick those that apply in the first column

B) Please rank the main 3, with 1 = main method

	APPLY	RANK
Ticking sums right or wrong		
Verbal Feedback		
Give maths scores on maths test		
Write comments after test or copy work.		
Give stickers with feedback comments		
Give out stars		
Other		

25) Please outline the level of agreement or disagreement with the following statements about your own attitude to teaching Mathematics.

Using a rating scale: Strongly Disagree (SD) Disagree (D) Undecided (U) Agree (A) Strongly Agree (SA). Please respond to each statement.

	SD	D	U	A	SA
I mostly teach Mathematics the way I was taught at school					
Maths is about getting the answers right					
It is better to teach the Maths procedures and rules first					
Teaching pupils Mathematics in the senior classes with different abilities is very difficult					
Only some people are good at Mathematics					

(3)Textbooks

26) What are the criteria for selecting a Maths Scheme in your school:

A) Please tick those that apply in the first column

B) Please rank the main 3, with 1 = main criteria

	APPLY	RANK
Content of Material		
Layout of Programme		
Availability of Teacher Resource Book		
Plenty of exercises to complete		
Pupils can write on the books		
Colourful Presentations		
Plenty of methods explained		
Accessibility and Inclusive Design		
Ancillary Materials		
Tests included in package		
Other (Please state)		

We choose not to follow a Maths textbook scheme ❑

27) Please rank the three biggest influences in writing up your yearly Maths scheme marking 1 = biggest influence

	RANK
Yearly scheme supplied with the Maths book	
NCCA Curriculum handbook	
Whole School Curriculum Plan for Maths	
Other (Please state)	

28) To what extent do you currently use a textbook to teach pupils Maths in your class?

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

29) How many Maths textbooks do the pupils use themselves in the class?

0 ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ >5 ❑ Please specify number _____

30) How satisfied are you with the current Maths textbook(s) you use?

Very dissatisfied ❑ Dissatisfied ❑ Somewhat satisfied ❑

Satisfied ❑ Very Satisfied ❑

31) How confident would you be teaching Maths without a textbook?

Not at all confident ❑ Somewhat confident ❑

Neutral ❑ Confident ❑ Very confident ❑

32) To what extent do you follow the layout of the Maths textbook?

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

33) What strands would you be happy to teach without using a Maths textbook at all? Tick all that apply.

Number ❑ Data ❑ Measure ❑ Shape and Space ❑ Algebra ❑

34) To what extent do you feel under pressure to complete the Maths textbook?

Never ❑ Rarely ❑ Sometimes ❑

Most of the time ❑ Always ❑

35) How important is the Maths textbook as a teaching aid to you in your classroom?

Unimportant ❑ Somewhat important ❑ Neutral ❑

Important ❑ Very important ❑

36) Please outline the level of agreement or disagreement with the following statements about Maths textbooks

Using a rating scale: Strongly Disagree (SD) Disagree (D) Undecided (U) Agree (A) Strongly Agree (SA). Please respond to each statement.

	SD	D	U	A	SA
Maths textbooks are especially helpful for teachers new to teaching a particular class group					
Maths textbooks provide organised units of work					
A Maths textbook saves the teacher time finding and developing similar materials					
Maths textbooks are a detailed sequence of teaching procedures that tell you what to do and when to do it					
Maths textbooks provide pupils with plenty of practice in Maths					
Maths textbooks are excellent teaching aids					
Teachers over-rely on Maths textbooks					
Maths textbooks insufficiently cover some strand units					
Maths textbooks tend to focus on low-level or procedural questions					
The reading level of the Maths textbook is too difficult					
Maths textbooks don't allow for differentiation					
The Maths textbook needs to be supplemented with other materials					
Textbooks are outdated and should be replaced by tablets / laptops					
There are not enough Maths questions for my class to do and I'm constantly having to source extra work.					
Problem-Solving is covered very well in Maths textbooks					

	SD	D	U	A	SA
The content of the Maths textbook doesn't take into account the socio-economic background of the pupils					
Pupils should have to complete a Maths textbook fully before moving onto the next Maths textbook					

37) Do you intend to use a textbook when following the new curriculum?

Never ❑ Occasionally ❑ Unsure ❑ Most of the time ❑ All of the time ❑

Have you any other comments to make about using Maths textbooks with pupils with Special Educational Needs? _____

_____

_____

APPENDIX 2: INTERVIEW SCHEDULE FOR CLASS TEACHER

Warm up questions:

- Can you tell me how long you've been teaching?
- What class groups have you taught? What class are you currently teaching?
- Have you been a Special Education Teacher / Learning Support at any stage of your career?
- Do you enjoy teaching Maths at school? Why / *Why not?*

Interview Schedule

Possible questions
1. Do you use maths textbooks in your classroom?
2. How do you use the Maths textbook to teach Maths?
3. What do you think of the maths textbook as a teaching resource in your experience of teaching?
4. Why do you think teachers use a Maths textbook?
5. What is your experience of other teaching methodologies that don't involve using a text book?
6. The PDST has published teaching manuals that promote hands on learning and concrete material use. Have any experience of using them?
7. In your experience, what pupils may not use the same textbook as the majority of the class?
8. How do you deal with a diverse range of abilities in mathematics in your class?
9. Do use team teaching?
10. In your experience what are the challenges teachers and SET face when teaching Maths in 4th, 5th and 6th classes?
11. How do you support pupils with SEN in maths class?
12. What feedback do you give pupils?
13. Do you differentiate for your pupils during maths lessons?
14. In your opinion, does teaching using the Maths textbook allow for the inclusion of all pupils in the class?

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Personal Reflection on Practice as a Basic and Senior High School Teacher Using Gibbs Reflective Model: Universal Design for Learning (UDL) in Focus

This reflective paper discusses my personal experiences in teaching and how I have unconsciously applied the principles of the Universal Design for Learning (UDL) at the basic school and Senior High school levels in Ghana. I offer a window into my professional practice and justify why I support the overarching purpose of the UDL framework that advocates the multimodality of learning environments fueled by multiple forms of representation, processing, and motivation. Gibbs' reflective cycle was adopted in giving structure to the paper and its flow of discussion. Qualitative data was generated using an unstructured interview schedule with thirty-one (31) students selected via convenience and snowball sampling procedures. The qualitative data garnered were analyzed thematically under the three key principles in UDL. The study opens a dialogue on how the principles of UDL could be actualized in the classroom setting using personal teaching experiences. Also, I share relevant points from the UDL workshop that I attended. I contend that the diversity of student learning and thinking styles calls for plurality in the representation of content, engagement as well as action and expression of learned content to maximize students' learning outcomes and general development.

Keywords: *Gibb's reflective model; universal design for learning; inclusive education; learning styles; teaching; learning; Ghana*

DICKSON ADOM is a senior member and researcher in the Department of Educational Innovations in Science and Technology at the Kwame Nkrumah University of Science and Technology, Ghana.

Corresponding author: dickson.adom@knust.edu.gh/ adomdick2@gmail.com
ORCID: 0000-0002-0559-4173

INTRODUCTION

Over the years, I have been using different approaches for co-constructing knowledge as a teacher with my students with the sole aim of assisting all students to understand and excel in the subjects I teach. Upon learning about the Universal Design for Learning (UDL) framework[1], I noticed that I had unconsciously applied its principles over the years as a basic and as a Senior High school[2] teacher.

In this paper, I present a reflection of my professional experiences as a teacher over my fourteen years professional teaching career and how they align with the principles of the UDL framework. I commence this paper with a brief description of the UDL framework and the principles that underpin it. This is followed by insights on the benefits of the professional use of the UDL framework in reported studies. I then present the international and national policy frameworks on the UDL framework in educational institutions before sharing the reflections on my practice as a teacher that aligns with the UDL framework using Gibb's reflective model.

LITERATURE REVIEW

Universal Design for Learning (UDL) is an educational framework that calls for equity in teaching and learning for all students. The term 'Universal Design' is credited to Ron Mace, an architect and disability rights advocate who coined the term in 1988 (Courey, Tappe, Siker & LePage, 2012) to make products and environments user-friendly for all persons irrespective of their varying features without giving room for users' customizations (Center for Universal Design, 2015). However, the Universal Design for Learning (UDL) framework was developed by the Center for Applied Special Technology (CAST) based on the Universal Design principles (Rao et al., 2014). The UDL framework is a scientifically valid framework (Higher Education Opportunity Act of 2008; Boothe, Lohmann, Donnell, & Hall, 2018) for guiding educational practice that provides flexibility in the ways information is presented, in the ways students respond to or demonstrate knowledge and skills, and in the ways, students are engaged; and reduces barriers in instruction, provides appropriate accommodations, supports, and challenges,

[1] I was enlightened about the Universal Design for Learning framework from September 27th to September 30th, 2021 at a four-day workshop organized by the National Teaching Council (NTC) in conjunction with the United Nations Children's Fund (UNICEF).

[2] A basic school is the same as a primary school or national school in the Irish context. Senior High School is the same as High School or Secondary School in the Irish context.

and maintains high achievement expectations for all students, including students with disabilities and students who are limited in English proficiency (Higher Education Opportunity Act of 2008). It calls for the deployment of a flexible approach to delivering the requirements of the teaching curricula (Hunt, 2017) to aid in offering equal learning opportunities for all students irrespective of their learning styles and differing abilities (Meyer et al., 2014). It is the responsibility of the instructor to ensure that all students are given equal access to the delivery of the teaching and learning activities (Snow, 2018) addressing the limitations of the traditional 'one size fits all' curriculum (CAST, 2018).

The principles that underpin the UDL framework are evidence-based and rooted in the fields of neuroscience and educational psychology. The UDL framework is divided into two layers, which are the conceptual layer and the implementation layer (Center for Universal Design, 2015). The conceptual layer is built on three networks of the brain which are the recognition, strategic, and affective networks. The recognition network represents the 'what' of learning and highlights the different learning ways of understanding and constructing meanings from the content learned. The strategic network represents the 'how' of learning which is concerned with the different ways thoughts and ideas are organized. Finally, the affective network focuses on the 'why' of learning. It highlights the motivations and engagements for students to sustain their interest in learning a particular content (Snow, 2018).

On the other hand, the implementation layer consists of three key principles that correspond to the three brain networks. These three key principles are designed to reflect the nine guidelines and 31 checkpoints of the UDL framework (Rose & Meyer, 2002). Figure 1 shows the three key areas in the implementation layer of the UDL framework and their overarching purposes. First, multiple means of engagement refer to the diverse ways of sustaining the interest and motivating students to learn. This implies the use of varied teaching approaches from lecture, discussion, project work, peer-tutoring, and many others. Secondly, multiple means of representation require the use of diverse approaches in presenting the content to students. This includes the use of videos, audio, text, graphs, maps, diagrams and other varied means in presenting the content to students. This diversity in the way content is presented accommodates the variety in the learning styles of the students such that learning is not skewed for the benefit of the few but all students. Lastly, multiple means of action or expression require the use of diverse ways of soliciting the understanding and knowledge of students regarding the learned content. Instead of the straight jacket sit-down written exams, the teacher has to introduce and/or allow students to use other means in expressing evidence

of knowledge. This may include the use of interviews, written scientific papers, written and oral quizzes, and the use of videos, audio and graphics in assessing the understanding of students of the learned content.

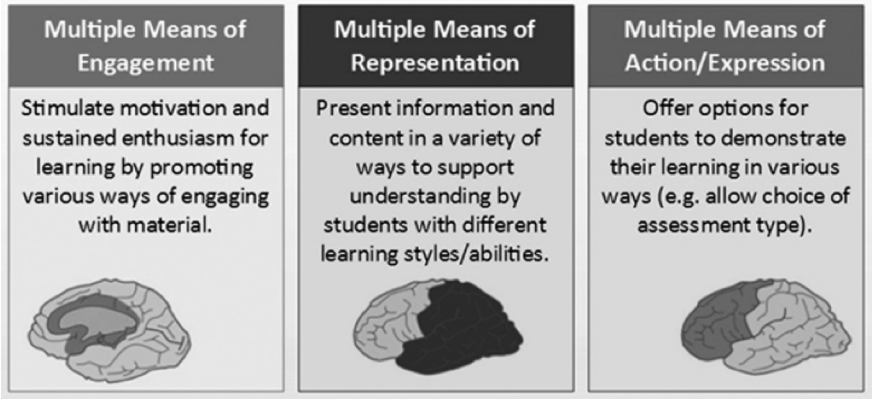

Figure 1: The Universal Design for Learning Framework Source: Hancock (2019)

UDL implementation in educational institutions has been reported to benefit students, teachers and educational institutions in the effective deployment of the teaching and learning activities (Snow, 2018). The multiple means of engagement, representation, and action or expression have been reported to build confidence in all students (Kumar & Wideman, 2014), positively translating into an increase in their learning outcomes (Hall et al., 2015; Al-Azawei et al., 2016; Landin & Schirmer, 2020). Though the UDL framework offers additional support to all students, students with intellectual disabilities have been reported to benefit from it. For instance, in a reading course, Coyne et al. (2017) reported a large increase in the reading comprehension skills of students with intellectual abilities in their class. Snow (2018) noted that when he adopted the UDL principle of multiple means of action or expression in assessing the understanding and knowledge of learned content for his art history students, this aided in reducing their anxiety and ensured that constant feedback and communication ensues between the teacher and the students. Similarly, Kuh (2008) reported that the implementation of the UDL principles in the teaching and learning activities built a close relationship between the teacher and the students. Teachers have also been beneficiaries of

the UDL framework. Some studies have reported on how the application of the principles in the UDL framework has assisted teachers and educational institutions in enhancing the accessibility of their teaching curricula, making their teaching styles more accommodating, flexible and student-friendly (Courey et al., 2012; McGhie-Richmond & Sung, 2012; Smith & Harvey, 2014; Mavrou & Symeonidou, 2014). It makes teachers adopt student-centred teaching approaches that engage the students, making them take full responsibility for discovering knowledge (Adom et al., 2016).

International Policies and National Policies that reflect on the Universal Design for Learning (UDL) Framework

The United Nations Convention on the Right of the Child of 1989 proposes equal rights for every child, including education without any form of discrimination (United Nations, 1989). In 1990, the nations of the world signed up to the World Declaration on Education for All in Jomtien, Thailand which emphasized the right to education for all and in 1994, 92 governments reiterated their commitment to promote inclusive education, especially for students with special education needs in the Salamanca statement and framework for action on special needs education. The United Nations Convention on the Rights of Persons with Disabilities of 2006 posits that all persons with all forms of disabilities must fully partake in all forms of human rights, including the provision of inclusive and equitable education. Recently, the 2030 Agenda for Sustainable Development's SDG 4 (United Nations, 2020) aims at ensuring inclusive and equitable quality education while promoting lifelong opportunities for all.

Ghana is a signatory to these international policies that encourage inclusive and equitable education for all persons. Interestingly, the national policy instruments in Ghana reflect these international conventions to which the country has been a signatory and the constitution of the Republic of Ghana has shown its full commitment to ensuring equity and inclusivity in education. Article 25(1) of the constitution of Ghana states that all persons, irrespective of their diversities in physical, intellectual, emotional, and intellectual abilities, have the right to equal educational opportunities and facilities. In 2008, the Education Act, Act 778 was enacted affirming the need for educational institutions at all levels in the country to ensure equitable access to teaching and learning, promoting the full participation of all students regardless of their varying educational needs. Now, there is a national inclusive education policy (2015-2019) which takes cognizance of the variance in the learning needs of students and encourages all educational institutions to address these diverse learning needs using the principles in the Universal Design for Learning framework. The policy's

objective two is specifically directed to the conscious deployment of the UDL framework in the deployment of teaching and learning in all Ghanaian schools at all levels (Inclusive Education Policy Implementation Plan, 2019). It calls for the promotion of a Universal Design for Learning (UDL)/student-friendly school environment for enhancing the quality of education for all students. Among the strategies to realize this objective include the revision and review of the national curricula content to make it more responsive and representative of diversity, adequately equipping teachers to accommodate the diversities in their students in their teaching and learning activities while ensuring that provisions are made for educational institutions to get access to assistive resources and personnel to deploy equal and qualityeducation for all students.

Despite years of implementing the policy, many educational institutions and teachers in Ghana are not familiar with the policy and its demands. Asamoah et al. (2022) in their recent study investigated some of the hindrances to the implementation of the policy and how they could be addressed from the perspective of social workers and policymakers. Like the national inclusive education policy, it is not surprising that the Universal Design for Learning framework has not been popularized enough at the various educational institutions in the country. Commendably, there have been steady efforts by the National Teaching Council with the support from UNICEF in organizing trainer of trainees' workshop on UDL for teachers in the various educational institutions to popularize the framework and encourage its full implementation in all the educational institutions in Ghana. Fortunately, I have been a beneficiary of such training and I now share my knowledge on it via scholarship, hence this study.

METHODOLOGY

This study presents personal reflections on my professional teaching at the basic school and senior high school levels and how I unconsciously utilized the principles in UDL. The study meticulously followed Gibb's reflective model-Figure 2 (Gibbs, 1988).

The reflective cycle begins with a detailed description of how the experience happened and its outcome followed by a succinct discussion of my feelings about the experience and an evaluation of the experience with its successes and weaknesses.Following an analysis of the experience in light of theories and scholarship in the literature, tentative conclusions from the personal experience analyzed are drawn with general and specific lessons highlighted and action plans

Figure 2: Gibb's Reflective Model: Source Gibb (1988)

summarize what needs to be done to improve the experience in the future.

Twelve (12) basic school students and nineteen (19) Senior High School students were sampled using convenience and snowballing sampling techniques. The Senior High School students were selected conveniently because they were still in the Senior High School where I taught. The other basic school students were traced using the snowballing technique because they had graduated and many of them were now in different Senior High Schools. All the students selected voluntarily agreed to share their reflections on the instructional approaches that I used while they were in my class. An unstructured interview schedule on the perceptions of the students on the instructional approaches concerning the three principles in the UDL framework was designed. It was pilot-tested on a section of the sample to validate it before it was finally used for gathering the data for the study. Qualitative face-to-face and telephone personal interviews with the students were carried out to solicit their views. Quotes from some of their views expressed during the

qualitative interviews were included in the reflections.Students' views were audio-recorded and carefully transcribed and the transcribed document was read out to some of the study participants in a data verification exercise I carried out. The data garnered were analyzed thematically using the thematic data analytical procedure with the themes grouped under the three key principles in UDL.

To ensure ethical research, letters to embark on this reflective study were sent to the heads of the Basic School and Senior High School where I taught. I explained the study's purpose, its objectives, its voluntary nature and participants' rights to stop the research at any time, and procedures to protect the confidentiality of participants' identities and views (Bailey, 1996) were thoroughly explained to all the study participants. Their consents were sought, some in written form while others in the verbal form before their views, pictures of themselves and their project works were used. All the study participants were assured of anonymity of their identities and views which were used solely for purposes of research.

FINDINGS AND DISCUSSION

In this section, I share personal reflections on the professional teaching experiences I had first at the basic school level teaching Information and Communication Technology (ICT) course for students at the basic school level and then when I taught General Knowledge in Art (GKA) at the Senior High School level. In the discussion presented here, I used the three key principles in the UDL framework while occasionally highlighting some of the UDL framework's guidelines checklist that I unconsciously applied. Using Gibb's reflection model as a guide, I discuss how I applied the philosophy of the UDL framework from the introduction of the lesson through to assessment of students.

Teaching an Information and Communication Technology (ICT) Course for Students at the Basic School Level

Principle One: Multiple Means of Representation

In teaching Information and Communication Technology (ICT) at the basic school level, I varied the way I presented the content to the students. I carefully selected pictures that narrated the steps in undertaking simple tasks on the computer such as creating and naming folders. I first showed a video of a child, following meticulously the steps for each activity after which I presented a PowerPoint presentation of each of the steps with text and pictures.Then I demonstrated the steps on the large screen one after the other and to help them grasp the skill, the students followed along and practiced each step on the computers. I then

went round to check on the progress of each student. I had two cards for each student. One had the inscription 'I need help' and the other 'Repeat the processes' which I had explained to the children, when and how to use when I am teaching. I responded quickly when a student raised any of the cards. For some of the lessons on procedural steps in undertaking some activities on the computer, I used still pictures that showed the processes with cartoon characters. This made it exciting for the students to follow along and grasp the skill. I played audio versions of the steps in both English and Asante Twi, the local language spoken by the students in my class. I felt excited to notice how the students were eager to learn and follow the steps for each activity on the computer. I was delighted I spent time preparing the plural content for the students because I was able to meet the diversity in the learning styles of all the students.

The above approaches enhanced the understanding of the pupils of the content taught. I observed the satisfaction expressed by the students in their facial expressions and words of appreciation of the plurality of representation of the content. One student told me during one of the interview sessions:

> *Sir, we loved your class because it was exciting. It was not just talking and talking as other teachers do, we watched videos, discussed pictures, we listened to and recited rhymes on what we are learning. Though I didn't have a personal computer at home at that time, what I learn in your class was enough for me to be a computer guru* (BSL-4, Focus Group Discussion 02).

Another said: '*I was active and so were my classmates in your class because the participatory activities kept us busy; they kept us exploring and discovering knowledge in I.C.T.'* (BSL-3, Personal Interview on Telephone).

However, I noted that because the audio formats of the content I prepared were fast-paced, many of the students complained they didn't hear. I had to play them more than twice, pausing in-between to help them assimilate the content.

Using text, videos, pictures and audio in presenting the content in each class, I was able to help the diversity of students in grasping the content. My experience is consistent with the findings of Kennedy et al. (2013) and Snow (2018) who observed increased learning outcomes after applying the UDL principle to multiple representations of content. Generally, I contend that multiplicity in the representation of content for students yields more learning outcomes, and increases and sustains students' involvement in the teaching and learning processes. More so, the content and the mode of their representation must be age-appropriate. Children in the early childhood stage are fascinated with cartoon drawings and

pictures as well as the use of bright colours (Kocak & Goktas, 2021). This must be considered when preparing the contents in videos and graphics format. Also, when the audio format of the content will be prepared for early childhood stage students, the tone of the language must be slow and very audible for the students to be able to grasp it. Later realizing the children loved rhymes, I used rhymes or songs as proposed by Pramling and Carlsson (2008). The lesson is that instructors must carefully prepare the content in different formats with the age, interests, and abilities of all the students in mind. Customized content for each class yields more success in its application during the teaching and learning processes. This agrees with the UDL guidelines checklist on providing options for the perception that proposes the customization of the content displayed. Emphasis is placed on the careful selection and use of colours, volume or rate of speech or sound, the layout of visuals, and the animation type and timing which have to be customized with the students' characteristics in view (CAST, 2018). Prepared content in plural form might look exciting. However, if it is not done well with the students in mind, the time spent will be in vain and the purpose of embracing diversity could be missed.

Principle Two: Multiple Means of Engagement

I employed multiple approaches in engaging students via the use of different instructional strategies. I noted that the students were more active in their listening during the mornings. So, based on a discussion with the students, I taught aspects of the subject that involved sharing important foundational knowledge using the lecture and discussion method. However, in the afternoons, I used other instructional methods such as practical hands-on activities and projects, demonstrations, small group discussions as well as peer-tutoring when their attention on auditory content did not yield many results. When I gave them practical hands-on activities such as using particular application software such as the use of Paint4Kids in teaching the students the art of painting, I demonstrated on the large screen how and when to use each of the tools. Then I divided the students into small manageable groups to discuss the tools using their peers who had demonstrated enhanced understanding as leaders. There were times I gave different tasks to different sets of students. This was helpful for students who needed extra attention. For some of these sets of students, I gave them additional lessons outside the classroom, in the airy spaces under the giant trees in the school. Offering personal assistance to the students and using their peers as coaches helped to optimize their learning motivation as highlighted in the UDL guidelines checklist on providing options for self-regulation. These approaches aided in sustaining students' enthusiasm for learning the content. I felt excited that I was able to achieve equity in the delivery of the teaching and learning activities, not leaving any of the students behind because

of the difficulty they encountered in the learning process. I share the personal belief that everyone is important and as such, education should be the right of every child and not a few privileged ones. However, in using peers as tutors to help students, they must be prepared well to understand their roles and how they needed to perform them to yield positive results. As I was carrying out the supervision of their peer tutoring, I noted that because I failed to provide training for peer tutoring, some of the students assigned as peers used derogatory terms for some of their peers who were not meeting the minimum course requirements and consequently some of the students did not feel comfortable with their peers helping them grasp the content.

Generally, the approach worked well for the majority of the students who received the mentoring and coaching from their peers as well as the remedial tuition from me. One student who is now excelling at the Senior High School level told me in the interview:

> *When my colleagues and some teachers thought of us as empty-headed, you had time for us. You constantly motivated us and geared us on. You assured us that we can make it and that we should keep learning. We did and now we are doing well'* (BSL-1, Face-to-Face Personal Interview).

Principle Three: Multiple Means of Action and Expression

Students have diverse ways of demonstrating their learning. This diversity must be acknowledged by teachers in their quest to find out from the students whether or not learning has taken place. In the case of students at the basic school level, ensuring flexibility by offering them plural opportunities to demonstrate their learning is crucial as many of them are unable to meaningfully construct textual evidence of their learning. I adopted formative means of action and expression strategies to ascertain evidence of learning for each topic taught to the students. The students were offered the flexibility to present their work in any format of their choice for example written text, pictures, drawings, stage-performed acts, and oral presentations. I received many drawings on the tasks I gave them, though others preferred to give oral presentations in class while some presented textual information on the assigned tasks. However, I encouraged them to try using varied formats in presenting the different tasks or assignments.. I prepared an analytical rubric (Appendix 1) for all the assignments and tasks concerning the learning objectives and learning outcomes for the course, setting out the criteria and what was required for each level of achievement. In doing this I used three major levels of achievement which are the junior apprentice, the chief apprentice and the master as I often motivate my students to always be masters in a suit and not just

junior apprentices in a T-shirt.The clear analytical rubrics I developed for the tasks I gave them and the flexibility to present their assignments in any format of their choice helped me in better ascertaining the understanding levels of all the students, including those who couldn't express themselves well using text.

I felt excited because I respected their differences and appreciated their strengths demonstrated in the format they chose to represent their actions and expressions. In addition, the scores increased for students who were not able to meet the minimum requirements of the course.

The students expressed similar sentiments:

> '*When you allowed us to use the format we liked to do assignments, I was happy because I could use drawings to present my understanding better than text. Also, it improved my scores. I had more understanding of the content when my classmates presented orally too, something I didn't know how to do it. It was indeed a learning experience for us'* (BSL-8, Face-to-Face Personal Interview,).

The UDL framework proposes such flexibility in eliciting the actions and expressions of the students (Rose & Meyer, 2002). Empirical evidence from Johnstone (2003) revealed that when a standardized assessment test was made UDL compliant, allowing greater flexibility for the students to demonstrate their actions and expressions in diverse formats, the scores of traditionally underperforming students increased significantly. This highlights the importance of multiplicity in presenting students' actions and expression of the learned content. That notwithstanding, I noted that though UDL allows for such flexibility, there is the need to consciously help students to develop skills in other areas which are not primarily their domain of choice. This is important to ensure the total development of student's abilities. Thus, in the future, I would like to take detailed records of the mode(s) of students' actions and expressions and help those who often use one mode, such as only text or only audio to try using other formats by offering them assistance in doing so.

Teaching General Knowledge in Art (GKA) at the Senior High School level.

Principle One: Multiple Means of Representation

At the Senior High School level, I was assigned to teach General Knowledge in Art in an all-female Senior High School. I couldn't understand why a greater section of the students performed poorly in the subject. At the departmental meeting, I suggested we adopt a UDL framework to help improve the performance of the students and they unanimously agreed. So, we increased practical and

adopted varied instructional materials such as using simple charts for teaching art history content, PowerPoint presentations, videos, oral and audio recordings in presenting the content as suggested by Rose and Meyer (2002). For instance, I screened posted videos on YouTube on Ancient Art history, African Art history, and Global Art history in general during class hours. After watching the videos with the students, I grouped them into small groups for them to discuss the videos andpresent their reflections in class using PowerPoint presentations. In our PowerPoint presentations, we included pictures in the text and sometimes we incorporated short videos for reflections. Interestingly, the students followed our example whenever they had group presentations. In the practical lessons, I downloaded videos on the procedural steps for still life drawings, figure drawings, landscape drawings as well as on paintings. I watched them with the students and we discussed them together. I demonstrated what we watched in the videos to them and I asked them to practice. I monitored their progress and offered coaching when necessary to help the students in attaining practical knowledge. I invited artists to the school and hosted art talk sessions with them and the students. The practising artists shared their experiences in their art practice, especially their philosophies, material choice, techniques or styles with the students. The students had the chance to ask them questions and interact with them. This positively impacted their interest in the course. There were times I used pictures and replicas of artefacts or regalia in the art history timelines to augment the presentation of content. For instance, key artworks in any art historical timelines or for particular ethnic societies were shown to the class for detailed discussion using the procedural steps in visual and iconographic analyses.

The above approaches enhanced the skills of the students in art appreciation and criticism. Their interest in the subject increased and I noticed this in their general scores for the course at the end of every semester.

The views they expressed also confirmed that they deeply appreciated the multiple means of representation of the content. One of the students told me:

> *'Our interest in the course has increased greatly. Many of us now love art history, an aspect of the course we didn't like initially. Introducing varied means of representing the content, especially the videos, pictures for discussions and meditations, and others has helped us to develop a love for the course. The practical activities have helped us. In my case, sometimes when I produce works of art and send them home, my parents are amazed that I have been able to produce them. We are much grateful'* (SHS-12, Face-to-Face Personal Interview).

The varied means of representing learning content is helpful as every student, irrespective of their learning and thinking style feels represented and as such, fully benefits from the teaching and learning activities in the classroom as my experience affirmed. However, it requires good preparation and extensive lesson preparation to be able to select appropriate multiple contents that would be able to efficiently address the diversity in students' learning in a class.

Principle Two: Multiple Means of Engagement

I offered support to the students to help them understand the contents of the course during practical activities during class hours and after school. Mostly, I offered additional support for the students who needed more time to learn the content. I assigned students who have attained considerable mastery of the practical art activities as peer tutors to assist their colleagues. Also, students on Internship were assigned as teaching assistants to help the students in their practical training. Together with my colleagues, we organized interclass quiz contests and end-of-semester exhibitions to fuel interest in learning the General Knowledge in Art course. We rewarded students who demonstrated consistent performance and not just those with distinctions. We gave them art materials, textbooks, and certificates with their names written in calligraphy.

Shy students who were falling behind and others with special educational needs were encouraged by showcasing their works in the visual art studio. One of the students interviewed told me:

> *These extra efforts you [teachers in the Visual Art Department] put in are highly commendable. Students in other schools that we speak with don't have these privileges. You give all of us the needed support, and you don't leave anyone behind, even Ellen [Name has been changed], a Special Needs student. You sometimes come during the weekend to help us and we don't pay extra* (SHS-7, Face-to-Face Personal Interview).

Al-Azawei et al. (2016) confirm that the UDL framework, with its deliberate strategies to engage students positively impactstheir attitude toward learning, and engagement in class activities generally.

Principle Three: Multiple Means of Action and Expression

Instead of relying solely on the traditional sit-down written examination that was used to find out the level of understanding of students, I initiated using multiple means of action and expression. We allowed students to present practical assignments and oral presentations in addition to the written assignment presentations. Together with colleagues teaching the same course, we designed

analytical rubrics for the various tasks we gave the students assigning equal weight in scores for both the theoretical and practical content of the course. The end of semester exhibition (Figure 3) was added to their final assessment scores. The students were excited because the multiple means of expressing their actions and expressions in the area of practical skills is exactly what is done in their final assessment by the West African Examination Council (WAEC) known as the West African Senior Secondary School Examination (WASSCE). One of them said:

> *Initially, we did not give much importance to the practical aspect of the course. However, now our skills are honed in practical knowledge of the course. Happily, we can produce works based on the required standards by WA. We are confident we will excel in the final examination of the course* (SHS-4, Face-to-Face Personal Interview).

Figure 3: End of Semester Students' Exhibition

A comparison of the grades attained by the second-year batch of students with whom we initiated the new instructional methodologies rooted in the UDL principles in 2020 who sat for the 2021 WASSCE (2021 WASSCE results) with the grades attained by the previous year's cohort (2020 WASSCE results) shows a high increase in the students' academic performance (Table 1).

Table 1: Students' academic performance at the WASSCE in the General Knowledge in Art subject

Grading System	2020	2021
AI (Excellent)	**19**	**109**
B2 (Very Good)	**13**	**62**
B3 (Good)	**52**	**33**
C4 (High Credit)	**24**	**4**
C5 (Credit)	**12**	**1**
C6 (Low Credit)	**19**	**-**
D7 (Pass)	**3**	**-**
E8 (Pass)	**3**	**-**
F9 (Fail)	**3**	**-**
Total Number of Students	**145**	**209**

Source: WASSCE Results, School Administration, 2021

Many teachers in sister Senior High schools could not believe how we helped these young students in the school to excel in the General Knowledge in Art subject and we are proud to share the strategies with them to assist their students.

CONCLUSION

In this study, I have discussed the personal reflections of my teaching profession at the Basic School and Senior High school levels using Gibb's reflective model. Also, I have discussed how the approaches I have adopted over the years for the teaching and learning activities align with the key principles in the UDL framework. I must admit that my teaching approaches were not informed by any knowledge of UDL, thus, applying the principles unconsciously. The favourable comments shared by the students who experienced the teaching and learning approaches I used during the interview sessions as well as their academic performance affirms that the UDL principles when applied fully would positively reflect on students' learning outcomes. I contend that innovatively using multiple approaches in the classroom in all aspects of the teaching and learning processes ensures much inclusivity and equity while improving the learning outcomes of students.

Despite the strengths of this study, some significant limitations must be admitted. The study relied on the reflections of a small and manageable convenient sample

size which may not be a true representation of the entire student population. Also, the study was not based on a conscious deployment of the UDL framework, its principles and checklist. The approaches I adopted in my professional practice were compared to the key principles of the UDL. As such, the findings cannot be said to be attributed to the full and conscious implementation of the UDL framework. However, the scholarly reflections of my professional practice discussed within the UDL framework buttress the relevance of the framework in enhancing the teaching and learning processes while increasing students' learning outcomes evidenced in other UDL empirical studies reported in the literature. Future studies could explore more fully how the UDL framework is consciously applied to a course delivery using large sample sizes in quantitative or mixed methods designs and utilize validated psychometric scales in measuring the learning outcomes of students in the conscious application of the UDL. Now that I have been privileged to receive formal tuition on the UDL framework through the workshop I mentioned at the outset, I am now more determined than ever to improve the application of the UDL principles in the courses I teach now at the university. I am happy to assume the role of a trainer of trainees for the implementation of the UDL framework and support other teachers to apply the principles of UDL more practically in their teaching and learning activities. I recommend that the Ministry of Education in Ghana, the Ghana Education Service, and School administrators should organize workshops on UDL for the teaching staff in all educational institutions in Ghana to orient them on how the UDL framework could be actualized in the classroom settings to increase students' learning outcomes.

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Appendix: Analytical rubric developed by the author for ICT tasks

Criteria	Master (10 Points)	Chief Apprentice (5-7 Points)	Junior Apprentice (0-4 Points)
	 1. All the steps in undertaking the specific task on the computer have been stated correctly and orderly. 2. All the steps for the specific task on the computer have been explained well based on the student's understanding. 3. An excellent demonstration of how the task is performed on a computer.	 1. 60%-90% of the steps in undertaking the specific task on the computer have been stated correctly and orderly. 2. All the steps for the specific task on the computer are above-averagely explained based on the student's understanding. 3. A good demonstration of how the task is performed on a computer.	 1. 0%-50% of the steps in undertaking the specific task on the computer have been stated correctly and orderly. 2. All the steps for the specific task on the computer are averagely explained based on the student's understanding. 3. An average demonstration of how the task is performed on a computer.

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