An Analysis of Effective Teacher Professional Development Models that Support Teachers in Delivering an Inclusive Primary Mathematics Pedagogy for All

Professional Development Service for Teachers (PDST)

Inclusion has significantly shaped the composition of educational settings at all levels in the Republic of Ireland since the early 2000s. While the definition of inclusive education is continually evolving, the PDST primary STEM team supports teachers to facilitate inclusive practices. Recent policies have resulted in allocating additional resources to schools, however, despite this level of investment, there are significant challenges as schools continue to engage with the process that is inclusion. This paper notes that there appears to be a gap between the theories underpinning inclusive practices for all learners and the actual practices realised in primary mathematics. Analysis examines how effective teacher professional development supports teachers to co-construct inclusive practices for all learners in primary mathematics. This professional development is aligned to the bespoke Sustained Support Model (PDST, 2017) and the role of Collaborative Professionalism (PDST, 2021) in facilitating the conditions and cultures necessary to develop teachers' reflective and professional skill and autonomy in delivering an inclusive primary mathematics pedagogy for all.

Introduction

The Professional Development Service for Teachers (PDST) is Ireland's largest teacher professional development service supporting teachers and school leaders in a range of pedagogical, curricular and educational areas. It is funded by the Teacher Education Section of the Department of Education (DE) and managed by Dublin West Education Centre. As a key priority of the DE, inclusion is integral to the work of individual teams across the organisation. This professional development is informed by the PDST's bespoke Sustained School Support (2017) and Collaborative Professionalism (2021) models. In particular, this paper will examine how effective professional development supports teachers in co-constructing inclusive environments for all learners in primary mathematics. The paper concludes citing key considerations arising from the current gap that exists between the conceptualisation of inclusion policy and its enactment in the primary mathematics classroom.

Inclusion

The definition of inclusive education is continually evolving. Traditionally inclusive education concerned pupils with Special Educational Needs (SEN), however this definition has since broadened. Spratt and Florian (2014, p. 90) argue that inclusive education now encompasses "all learners who may be excluded or marginalised by the processes of schooling." Brennan et al. (2019) support this perspective, arguing that inclusive pedagogy avoids the exclusion of any learner. The PDST Primary STEM team is tasked with supporting teachers in realising inclusive pedagogy for all pupils in primary mathematics, science, and the STEM disciplines.

Policies for Inclusion

Schools across Ireland are required to engage with the process of inclusion as outlined in the policies and circulars issued by the DE and their supporting documents from the National Council for Special Education (NCSE) and the National Educational Psychological Service (NEPS). The *Learning Support Guidelines* (2000) promoted the planned implementation of shared teaching approaches, involving the class teacher and the special education teacher (SET), in the pupil's classroom. These guidelines outlined the disadvantages of frequent and prolonged withdrawal of pupils with SEN from their classrooms. Although substantial progress has been made, Project IRIS (2015) revealed strategies for promoting differentiated teaching were limited in most schools, and teachers often reported inadequate knowledge of specific teaching approaches. The dominant use of withdrawal was identified as a limiting approach to providing effective support. The *Special Education Circular 0013/2017* and *The Guidelines for Primary Schools - Supporting Pupils with Special Educational Needs* (DES, 2017) sought to address this and changed the landscape of how schools allocate special education teaching resources. These Guidelines emphasised the importance of co-operative or team teaching as an inclusive pedagogical approach where appropriate, for the holistic development of all pupils. The PDST Primary STEM team is entrusted with realising this inclusive pedagogy at a macro level through engagement with key stakeholders during policy development, and at a micro level by supporting mainstream class teachers, Special Education Teachers (SETs), and school leaders in improving the learning outcomes and experiences of all pupils.

Inclusive Pedagogy

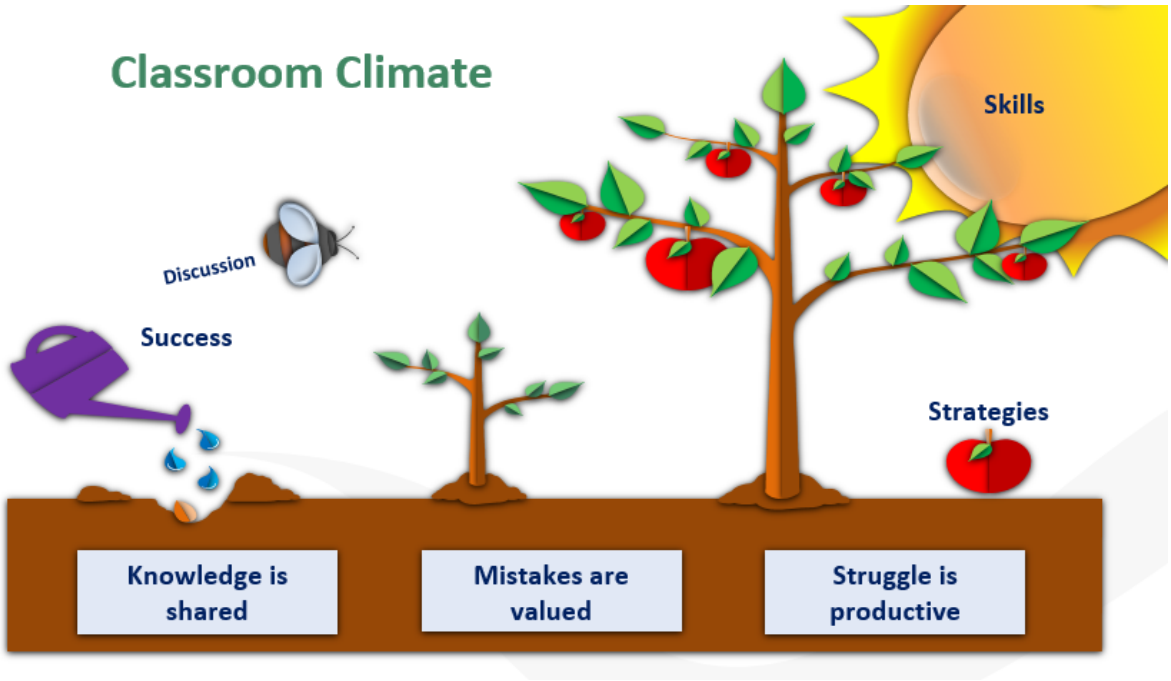
Rouse (2009) outlines three aspects involved in becoming an inclusive practitioner. They are 'knowing' (theory, policy and legislation), 'doing' (turning knowledge into action) and 'believing' (in their capacity to teach all children). Meaningful shift in pedagogical practice requires teachers to progress their understanding in all three of these domains. Professional development is central to supporting teachers in understanding and implementing inclusive pedagogy in primary mathematics. Brennan, King and Travers (2019) affirm this perspective when they assert that "teachers need to be effectively supported in developing their understanding of inclusive pedagogy in order to challenge hegemonic assumptions about difference and to develop inclusive practice." (p.4).

Enhancing teacher's belief in an inclusive environment may see a shift in emphasis from the more didactic teacher-led methods to more child-centred discovery, constructivist, or problem-solving and cooperative learning (Borko, et al., 2003). Teachers' ability to implement varying instructional strategies may be dependent on confidence in their self-efficacy to cater for diverse needs, as well as knowledge of their pupils' needs. We can assume, therefore, that "differentiated instruction is 'responsive' teaching rather than 'one-size-fits-all' teaching" (Tomlinson, 2003, p.151). This responsive teaching requires a child-centred approach where teachers have high expectations for all pupils, along with an in-depth knowledge of the curriculum and a pedagogical approach that is inclusive of all learners. Carefully chosen tasks

in response to priority learning needs, where appropriate, enable all pupils to experience success, while also providing stretch opportunities for other pupils. The PDST Primary STEM team developed the graphic below to help teachers visualise the elements of an inclusive classroom climate for primary mathematics.

Figure 1

PDST Primary STEM Inclusive Classroom Climate (2017)



Effective Professional Development for Inclusive Pedagogy

PDST Advisors support teachers and school leaders in developing inclusive practices through professional development models such as seminars, sustained school support and professional communities or collaboratives. These models encourage reflective practice through the school self-evaluation process. In response to Project IRIS (2015) and the SEN Guidelines (2017), the PDST Primary STEM team have facilitated seminars focused on team teaching in mathematics in Education Centres across the country. Advisors explore a range of models of team teaching which include lead and support, alternative teaching, parallel teaching, teaming and station teaching. These pedagogical models are intended to meet the targeted needs of pupils with SEN while improving outcomes, skills and experiences for all learners. In-class support models have a number of advantages, including the transfer of skills to the classroom teacher, increased collaborative planning and greater opportunities for pupils to keep pace with classroom work (Griffin and Shevlin, 2007). Arranging pupils in temporary mixed ability groups can lead to both improved student engagement and achievement compared to groups where pupils are tracked, streamed or grouped by ability (OECD, 2012). Team teaching reduces pupil teacher ratio and can enable pupils to focus on tasks that require them to rely on each other's skills, which tends to work equally well for all pupils (Slavin, 2010). Effective team teaching strives to provide pupils with SEN greater access to the wider

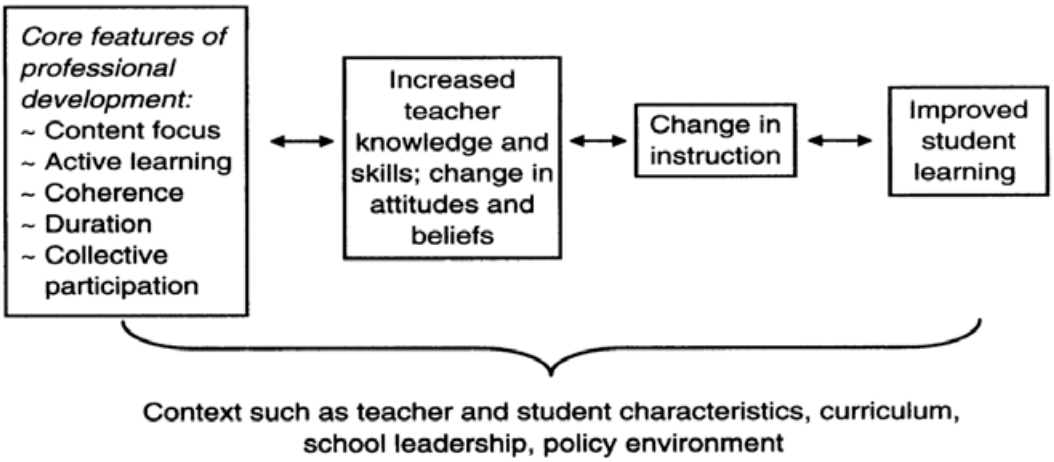
curriculum and a positive classroom environment that maximises the learning experiences and outcomes of all pupils.

The aim of these stand-alone seminars was to deepen SETs', mainstream class teachers' and school leaders' understanding of policy developments and inclusive teaching and learning practices. However contemporary research is consistent in its call for professional development that is sustained and contextualised while promoting continuous enquiry and problem-solving embedded in the daily life of schools (PDST, 2021). Sustained and effective support moves beyond the idea of singular "CPD" events and instead facilitates change in schools by empowering and enabling teachers to identify and collaboratively address the needs of their school context (PDST, 2021). Teachers should therefore be encouraged to engage with sustained school support as outlined by PDST (2017), during which they can develop inclusive approaches such as Team Teaching and embed pedagogical change over a period of time. Effective and sustained professional development is central to the continuous and cyclical nature of planning for the inclusion process. Sustained school support empowers teachers to develop their competence and confidence in relation to the inclusion of all learners (Travers et al., 2010), through building trust in collaboration with colleagues. As the literature suggests, teacher collaboration is a central facet to inclusive education (Ainscow, 2014; Friend et al., 2010; Nevin, et al., 2009).

Desimone's (2009) core conceptual framework for studying the effect of professional development on teachers and students (Figure 2) illustrates the bi-directional effects of effective professional development on improved pupil learning through continuous reflection and collaboration. Collaborative professional development can take many forms. The PDST Primary STEM team enables collaborative professionalism through sustained school support and in particular their Connecting Classrooms series of online collaborative communities. These models of professional development support teachers in a sustained and contextualised manner allowing them to co-construct inclusive pedagogies for mathematics over an extended period with the support of a PDST Primary STEM advisor. Sustained school support and the Connecting Classrooms series encourages a more collaborative approach to professional development compared to isolated individual school visits and stand-alone online events (PDST, 2021).

Figure 2

Proposed core conceptual framework for studying effects of professional development on teachers and students, Desimone (2009).



Key Considerations to Realise Inclusive Practices for All Learners in Primary Mathematics

There are a number of key considerations and challenges with regard to developing inclusive practices for all learners in primary mathematics. These exist both at a macro (systemic) and a micro (school/classroom) level.

At a macro level, policy provides structure and standards supported by research and theory within the particular field, in this case, inclusion for all pupils in the mathematics classroom. It is therefore essential that policy conceptualisation happens in conjunction with those best placed to inform and deliver the professional development models needed for its enactment. A unified development of policy alongside planned and sustained professional development benefits all stakeholders, and ultimately enhances the inclusion practices in primary school mathematics. Our ongoing consultation and engagement with NCCA and NCSE enables all stakeholders to establish a shared vision for the new Primary Mathematics curriculum, leading to better inclusion for all pupils in primary mathematics. This vision should be mindful of the time needed for change to become embedded in practice and how this change is impacted by other policies and curriculum development at primary level.

A significant challenge for professional development services is supporting teachers in understanding the complexity of implementing change(King, 2014), and to employ effective pedagogies for teacher learning that develop the knowledge, beliefs and practices to support inclusive pedagogy (Florian, 2008). Developing this collaborative culture takes time and conscious effort from all parties involved; teachers and, perhaps most importantly, school management (Hipp and Huffman, 2007)**.**

At a micro level, sustained school support is most effective when teachers are empowered by leadership to spend time engaging with advisors and the sustained support process in a meaningful way. In an effective inclusive school, school leaders work diligently

at leading this sustained support process and prioritize supporting professional development which responds to needs of teachers (Philpott et al, 2010*).* It is therefore incumbent upon professional development services to support school leaders in fostering a culture of collaboration between teachers, encouraging the sharing of practice, ideas and approaches, and thus empowering teachers to become more effective inclusive practitioners.

Conclusion

Since the turn of the millennium, inclusion has held a prominent position in policy and practice guidelines. Despite the consistency of this messaging, a gap remains between inclusive policy and practice, between vision and reality, between knowing and doing. Through professional development, the PDST endeavours to bridge the gap between the policies on inclusion and the everyday reality for teachers and pupils in classrooms.

In this paper, the sustained school support and collaborative models are recommended as an approach to address this gap. Collaboration and consultation with key stakeholders at the policy writing stage, is needed to enact a supportive and transformative plan for sustained school support. This plan should afford school leaders and teachers the time and support needed to work collaboratively, build confidence and competence to enhance their inclusive practice in primary mathematics.

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