

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

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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 NicMhuiri (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 than 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 NicMhúirí (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

<ul style="list-style-type: none"> • COVID safety procedures • Mathematics anxiety in pupils • Teacher preference • Too much class noise 	<ul style="list-style-type: none"> • Allows for better concentration • Ability grouping • Small classrooms • SETs can devote more time to needs of pupils with SEN
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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 4 th , 5 th and 6 th 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?