

A snapshot of the role of the textbook in English secondary mathematics classrooms

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The role and function of the mathematics textbook has been widely discussed since its inclusion in the Trends in International Mathematics and Science study (TIMSS) in the late nineties. It is a common feature in many classrooms worldwide and has been identified as an important vehicle for the promotion of curricula. However, there has also been much debate about the role of the mathematics textbook in the classroom and as a result there is anecdotal evidence to suggest a decline in the use of mathematics textbooks in England. This paper reports on an examination of the current role of mathematics textbooks in secondary and middle schools in the North-West of England based on teachers’ self-reported use of them. The data indicates that for all teachers, in this sample, who used a mathematics textbook, there is a positive correlation between the number of years teaching experience a teacher has and the amount of their classroom time that is ‘textbook driven’ and a negative correlation between the number of years’ experience a teacher has and the likelihood that they will use a mathematics textbook as their key resource for planning. These teachers also reported that they have access to a range of resources to supplement their use of mathematics textbooks and that they used textbooks in a variety of ways.

Keywords: Mathematics Education, Mathematics Textbook, Role of the Textbook

Introduction

Recent TIMSS studies in 2007 and 2011 included some discussion on mathematics textbooks, however the most recent TIMSS study that contained an explicit focus on the use of mathematics textbooks internationally was the 1999 TIMSS-R. This 1999 study, reported on by Valverde, Bianchi, Wolfe, Schmidt and Houang (2002), highlighted the association between textbooks and classroom practice in mathematics. Since then, Zhu and Fan (2006) have emphasised a renewed focus of research on mathematics textbooks. Such emerging research, often based on comparative studies, includes aspects aimed at identifying key features of mathematics textbooks and their role in teaching and learning (Fan & Zhu, 2000).

Howson (1995) and Schmidt, McKnight, Valverde, Houang and Wiley (1997) explain that the textbook was one of the key contributors in the implementation of mathematics curricula. Both studies highlight the intermediary role that the textbook plays between the intended and the implemented curriculum, not suggesting it is the curriculum itself but that it is ‘one step’ closer to the reality of the classroom. This view is reinforced by Valverde et al. (2002), when they indicate that there is a powerful link between the intended and the implemented curriculum. They suggest that the potentially implemented curriculum is affected primarily by the textbook, describing it as a ‘surrogate curriculum’. However, research also suggests that while the textbook can be a valuable teaching and learning resource, it can often fall short in terms of encompassing the entire scope of a national curriculum (O’Keeffe, 2014; Shield & Dole, 2013; Zhu & Fan, 2006).

Function of a Mathematics Textbook

Gelfman, Podstrigich and Losinskaya (2004) outline what they believe are the functions of a modern textbook; governing, developing, communicating and expressing, as well as being a resource for supporting individualisation and differentiation of teaching. This differs from other views on the role of a mathematics textbook, which centre on the textbook as a dominant teaching and learning resource. For example, Graybeal and Stodolsky (1986) propose that most teachers use mathematics textbooks faithfully and while Thomson and Fleming (2004) discuss the idea of a ‘prescribed’ textbook. Thomson and Fleming also suggest that mathematics teachers in the secondary sector tend to use textbooks primarily for planning and preparing. Rymarz and Engebretson (2005) add to this discussion by suggesting that when textbooks are used as a resource for preparation they have the potential to impact positively on teaching. However, Pepin and Haggarty (2001, p.124), suggest that, given the increased pressures that teachers are under, it is likely a textbook will “increasingly define the boundaries of what is possible in mathematics classrooms”.

Fan, Zhu and Miao’s (2013) recent work, which summarises research on mathematics textbooks, discusses the importance of understanding the function of a mathematics textbook. They draw on the work of Sosniak and Perlman (1990) to suggest that the power of a textbook is its ability to provide structure and sequence to teaching while also acting as a knowledge source. This means that a textbook can be central to making mathematics accessible (Straesser, 2009). However, Straesser (2012) adds that the role or effectiveness of a textbook can only be considered in light of its context. This view is supported by both Rezart (2009) and Schmidt (2012). Schmidt suggests that

how textbooks are designed provides a window into the nature of the mathematics that students are expected to learn. They characterise not only the content but also advocate what students are to be able to do with that content—what mathematical behaviours are to be encouraged. (p. 143)

In more recent times, the discussion around textbooks has been extended to include digital resources. The availability of reliable internet in schools and access to digital resources to support teaching and learning has increased considerably (Borba and Llinares, 2012), particularly in Western societies (van Deursen & van Dijk, 2015). The e-textbook is one such digital resource and hence relevant to any discussion about textbooks in the 21st century. Gueudet, Pepin and Trouche (2013) discuss the potential of e-textbooks, ranging from e-textbooks which are digitised versions of a hard copy textbook to interactive e-textbooks which include video, interactive applets and personalised assessments, to support an evolution of teaching and learning in mathematics, . However, as noted by Pepin (2015) there is still relatively little research on e-textbooks.

Textbooks in the classroom

As well as considering the range of ways in which the term ‘textbook’ can be defined, one also has to consider the complexity of the environment in which textbooks are used: the classroom. In considering this context, one must acknowledge that the relationship between the teacher and the textbook is multi-layered (Apple, 1992) and impacted on by factors such as beliefs, attitudes, and experiences, hence it can be described as a complex one (Rezart, 2009). Added to the complexity of this context is the ‘mistrust’ associated with textbooks in many countries (Newton & Newton, 2006). Newton and Newton (2006) refer

to the work of Issitt (2004), among others, suggesting that teachers who rely on textbooks can be perceived as lazy or as encouraging passive learning. Such deficit perspectives can lead to teachers being defensive about how they use textbooks. However, Foxman (1999) notes that the TIMSS–R study highlights that high levels of textbook use are not typically associated with the low performing students. He suggested a positive correlation (as identified by TIMSS) between textbook use and student performance. This he inferred from data that indicates that schools in the Pacific Rim and the Netherlands, who had greater reliance on the mathematics textbook than was demonstrated by their counterparts in England, had better mathematics achievement results (as per TIMSS-R, 1999). The data in Table 1 below supports Foxman’s claim, with the highest achieving students in England (based on the mean score) using a textbook for more of their class time.

Table 1

Approximate percentage of mathematics teaching time that is based on a textbook/scheme (Foxman, 1999 – based on TIMSS-R data)

Teachers of Year 9 students in England¹				
% of time spent using textbook/scheme:	0-25%	26-50%	51-75%	76-100%
% of Teachers:	6%	11%	45%	39%
Mean Score of Achievement for the students (Year 9) of each of these teachers:	472	507	514	524

¹Note: Figures are rounded and thus appear to add to 101%

Newton and Newton (2006) also discuss the role of a textbook in supporting the less experienced or out-of-field teachers. They suggest that a textbook can provide additional support to such teachers and contribute to better teaching and student motivation. Vincent and Stacey (2008) have a different perspective, suggesting that textbooks tend to provide more repetitive, procedural tasks which are often of low complexity and that this is a cause for concern, particularly in the context where they are relied upon by less experienced or knowledgeable teachers. Henderson and Hudson (2010) echo Vincent and Stacey’s concerns, reinforcing the point that the value of a mathematics textbook can be lost amidst a focus on repetition and memorisation of content. Vale (2010) adds another element to this discussion, suggesting that as teacher confidence improves they are less likely to rely on a textbook.

Mathematics Textbooks in classrooms in England

In the context of England, Pepin and Haggarty (2001) note that textbooks were often not available to students. This is supported by Askew, Hodgen, Hossain and Bretscher (2010) who argue that, according to the TIMSS-R data, textbook use in England is comparatively low. This may be attributed, according to Bokhove and Jones (2014), to the deficit view that the Office for Standards in Education, Children's Services and Skills (Ofsted) holds in regard to the use of mathematics textbooks. Haggarty and Pepin (2002) express some specific concerns about the role of the textbook in the English context, particularly in relation to the place of textbooks in lesson planning and activities. They discuss how French and German students are presented with stimulating and challenging mathematics in their textbooks and note that in England textbooks, when available, were “not as cognitively challenging as those offered in the other countries” (Pepin and Haggarty, 2001, p. 124). This, however, is not an issue unique to the UK. Howson (1995),

in the U.S., advocates the need for textbooks to provide more structure and more obvious links among the topics. While in Australia, Vincent and Stacey (2008) outline the need for more challenging mathematics and problems that promote critical thinking.

In terms of textbook selection, Newton and Newton (2006) suggest that different countries have different approaches to textbook selection. They identify four approaches where;

- The education authority (such as in the USA) provides guidance but leaves schools/teachers free to make their own decision.
- The education authority (such as Hong Kong) funds the provision of all text materials.
- Schools make their decisions but parents buy the books for their children (as is the norm in Ireland) and
- Schools purchase the texts for school use rather than individual use.

The latter describes the typical situation in the UK; the primary and secondary mathematics education system follows a National Curriculum and textbooks used are commercially produced and are selected by schools (Foxman, 1999). In a later report (published by National Federation for Educational Research (NFER), as Foxman’s was) Sturman et al., (2008) note that while there appeared to be changes in Year 5 mathematics, with 21% of teachers claiming they did not use a textbook, little has changed in Year 9. Table 2 summarises these findings (based on the 2007 TIMSS study) and following this Sturman et al. suggest little change with regard to textbook use over the four year period.

Table 2
Percentage of Year 9 students taught by teachers (in England) who report using a mathematics textbook (Sturman et al., 2008)²

		% in 2007	% Difference from 2003
Year 9 Teachers who use a mathematics textbook:	<i>As a primary basis for lessons</i>	43	-3
	<i>As a supplementary resource</i>	46	5
Year 9 Teachers who don’t use a mathematics textbook:		12	-2

²Note: Sturman et al. (2008, p.115) noted that data was provided by at “least 70 but less than 85%” of respondents; actual sample size not given.

There are a multitude of factors which impact on how beneficial a textbook can be and there is a wealth of research which investigates this. Suffice to say that the authors align themselves with the view of Remillard and Bryans (2004), in that a textbook as an entity is relatively straight forward to comprehend, however, its relationship and role in the context of mathematics classrooms is indeed complex. This study, however, does not intend to explore this relationship but will instead focus on the current role of mathematics textbooks as suggested by the participating teachers and seeks to investigate mathematics

teachers' experiences, perceptions and decisions with regard to textbooks in an English context.

Methodology

This study is a preliminary investigation intended to provide a greater understanding of the current role of mathematics textbooks in mathematics classrooms in a North-West County of England. The aim of this research is to investigate the use of textbooks in secondary and middle school classrooms and where possible identify how this compares with the reported data from TIMSS-R (1999). The key questions guiding this study are;

- What is the role of the textbook in mathematics classrooms (in North-West, England) and how different is this from the 1999 TIMSS-R study results?
- Does use of mathematics textbooks vary with teacher experience/qualification/confidence and how different is this from the 1999 TIMSS-R study results?
- What factors influence teachers' decisions with regard to textbook section?

The study is divided into two phases of data collection. The first phase involves the distribution of questionnaires to a sample of secondary mathematics teachers. As the intention of this study is to provide a basis for more detailed research into the specific findings and outcomes, a survey approach was utilised. A list of 336 schools in counties in the North-West of England, of convenience to the principal investigator, was obtained. From this list, 24 schools from the three counties (eight from each county) were selected at random and approached to be part of the study. Nine of the approached schools felt they were in a position to participate. The Head Teachers in the nine schools were required to complete a brief form (as well as the necessary consent forms) summarising the numbers of mathematics teachers in the school and their qualifications. Of the nine schools only six completed the consent forms and paperwork, providing a potential sample of 47 teachers. The 47 teachers were asked, through the Head of Mathematics at each school, to complete a teacher questionnaire. Of the 47 teachers, a total of 31 completed the required consent forms and the questionnaire, giving a final working sample of 31 middle and secondary school mathematics teachers from the North-West of England.

The teacher questionnaire, which forms the basis of the primary data collection for this study, was based on the Mathematics Teacher Questionnaire (MTQ)¹ which was used in the TIMSS-R study in 1999. This instrument was intended to identify differences across and between national education systems in forty different countries worldwide. MTQ contained 43 questions and comprised of two sections; one that focused on the teacher's personal information and attitudes and a second that focused on their mathematics teaching. The adapted MTQ used for this study comprises of 21 questions. The adapted instrument includes Q1-4 and 14 from section A of the original instrument and questions 4a and b, 9 and 17 from section B. Decisions about question inclusion/exclusion for the adapted instrument were based on relevance to the aforementioned research questions. For example, questions related to calculator and computer use were excluded while additional

¹ The full Mathematics Teacher Questionnaire is available here:
http://timssandpirls.bc.edu/timss1999i/pdf/BM2_TeacherM.pdf

total of 539 mathematics teachers formed the England sample for the original TIMSS-R (1999) survey. However, not all of these teachers were asked the same questions, as is typical of a TIMSS study. Thus, there is some variation in the sample sizes across questions with some questions not being asked to any of the sample of teachers in England. As this data provides an insight in the role of mathematics textbooks and their use in an English context in the late 1990s it provides for a useful baseline comparison with the primary data collected in this study.

Comparison of TIMSS-R sample and survey sample

The initial TIMSS-R sample for England included 539 teachers, however only 533 teachers responded to the questions relating to the textbook. Only 337 teachers were asked to indicate their gender. Of the 337 teachers 166 were female and 171 were male. Of these 337 teachers, 336 also responded with their years of experience. The range of experience was from one to 37 years with an average (\bar{x}) of 14.41 years ($SD = 10.17$). When asked about their teaching qualifications 95.2% of the teachers had Qualified Teacher Status (QTS). The most common time spent in teacher training was one year (170 teachers) followed by three years (78 teachers). However, one participant indicated that they had five years in teacher training. Also, only 335 teachers were asked for their age, the data for which is presented in Figure 1

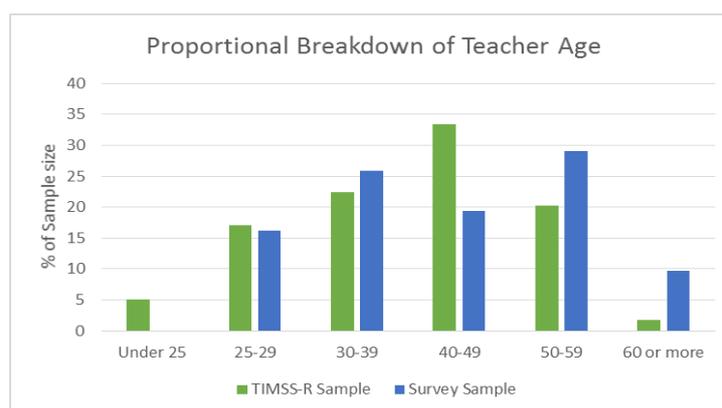


Figure 1. Breakdown of teacher age by category from TIMSS-R (1999) and survey (2015) samples.

In comparison, the survey sample for this study consists of 31 mathematics teachers, 11 of whom were male and 18 female (two chose not to answer this question). While the gender breakdown of the TIMSS-R data is almost equal (49% female and 51% male), the proportion of females in the 2015 sample is just over three-fifths of the total. However, the TIMSS-R study, as with the data for this study, did not identify any significant teacher differences based on gender and hence the variance in gender breakdown between samples is not of concern. The spread of age across the two samples is similar with the average age bracket of teachers from the two samples being 30-39. The number of years' experience teaching mathematics across both samples is also similar ($p > 0.05$), $\bar{x} = 14.41$ (TIMSS-R sample) years and $\bar{x} = 15.84$ (2015 sample, $SD = 11.24$) years. Given the variance in the size of each sample it is not appropriate to infer generalisations across the two samples. However, as the spread of teachers across both samples has a similar demographic it is reasonable to use the 1999 data as a baseline measure for the role of mathematics textbooks in the English context in 1999.

Presentation and Analysis of Findings

Throughout the remainder of this paper the TIMSS-R and primary data will be identified by year, that is the TIMSS-R data will be referred to as the 1999 data and the primary data will be referred to as 2015 (or survey) sample.

Selecting a mathematics textbook

The participating teachers were asked to indicate how much influence they have on selecting resources, textbooks and subject matter. The findings, which vary among all four elements, are presented in Figure 2 below. Analysis of this data, using Pearson's correlation, indicates that there is no statistically significant correlation between influence of such aspects and the teachers' years of experience teaching mathematics.

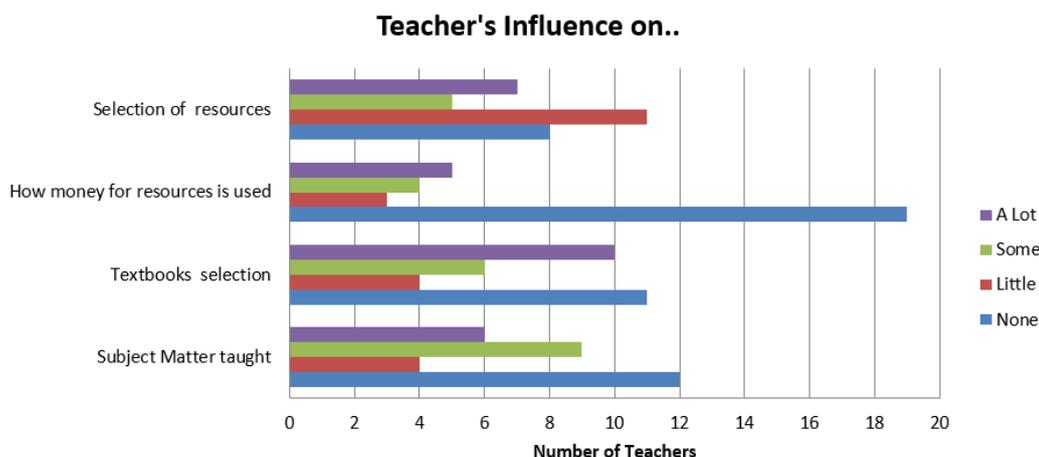


Figure 2. Teacher's (2015) influence on Resources, Textbook Selection and Subject Matter taught.

Regarding what factors influenced their decisions about textbook selection (or what they would be if they could make such decisions), the most common teacher responses were that they were using what was already available in the school (13 out of 31 teachers), and that someone else, such as the faculty as a group or a head of mathematics, had responsibility for textbook selection (15 out of 31 teachers). There is some overlap within this data as some teachers felt more than one response was reflective of their situation (see Table 4 below).

Table 4

Reasons for choosing their mathematics textbook

Faculty/ Coordinator Decision	Available Books	No explanation given	Questions Exercises	Book Characteristics	Curriculum/ Syllabus Coverage	Exam Focus/ Preparation
15	13	10	5	5	3	3

³Note: Some teachers provided a breakdown of decisions about textbook choice for different class groups; hence the number of teachers referred to here will exceed 31.

The 2015 teachers were also asked to identify what key characteristics of a mathematics textbook would impact on their decision to select or reject a textbook. Ten of the 31 teachers indicated that they would select a textbook based on the '*exercises and the*

extension material’ provided within. Four teachers made note of the type of ‘*tasks and activities*’ present while two teachers each noted the importance of ‘*relevance to examinations*’, ‘*content and layout*’, ‘*clear notes*’, ‘*instruction, diagrams*’, ‘*not just repetition*’ and ‘*best fit for the syllabus*’. The remaining five teachers referred to ‘*problem solving, investigation and rich tasks*’, ‘*relationship to Scheme of Work, layout and provision of answers*’, ‘*price*’, ‘*relationship between textbook authors and the examination commission*’ and ‘*no textbook used as there is a need to engage and motivate students*’.

Controlling for average amount of class time when a textbook is used, analysis indicates that teachers who did not get to select their own textbook account for ten of the 21 responses of those who use a textbook for less than 25% of their teaching time (see Figure 3 below), and also for five out of nine teachers who use a textbook for between 26 and 50% of their teaching time. The two teachers who indicated that they use a textbook for 76-100% of their teaching time both made their own decision in regard textbook selection. They both indicated that they base this decision on the type of practice questions and exercises which are presented in the textbook.

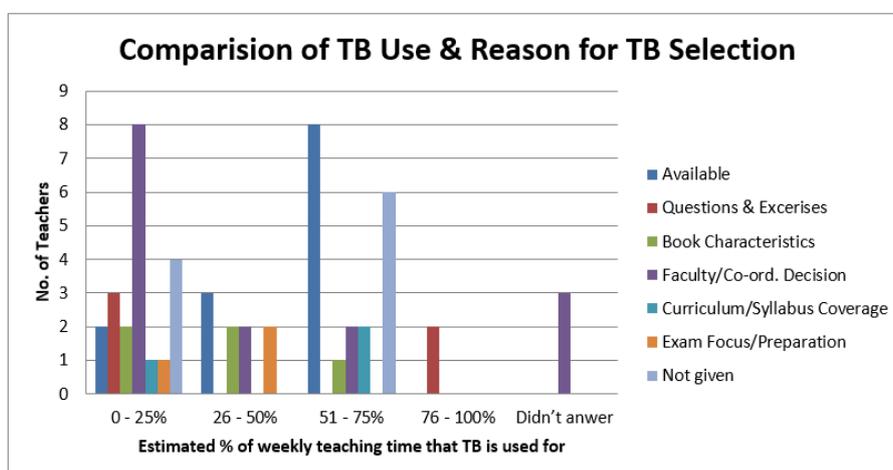


Figure 3. Breakdown of textbook use and reason for selecting the textbook in question by the 2015 Teachers.

Teachers Use of Mathematics Textbooks

Of the TIMSS-R (1999) teachers, 93% indicated that they use a textbook, with a large proportion of these teachers indicating that they use textbooks for more than 50% of their teaching time (Figure 4). The 2015 data, presents, in comparison to the 1999 data, a small decrease in the percentage of teachers using a textbook (down from 93% to 90%) and a change in the amount of teaching time for which they use a textbook. A smaller proportion of the 2015 mathematics teachers are currently relying on textbooks for large portions of the class teaching with only one teacher indicating that they use textbooks for 76-100% of class teaching in comparison to over 35% of the 1999 sample.

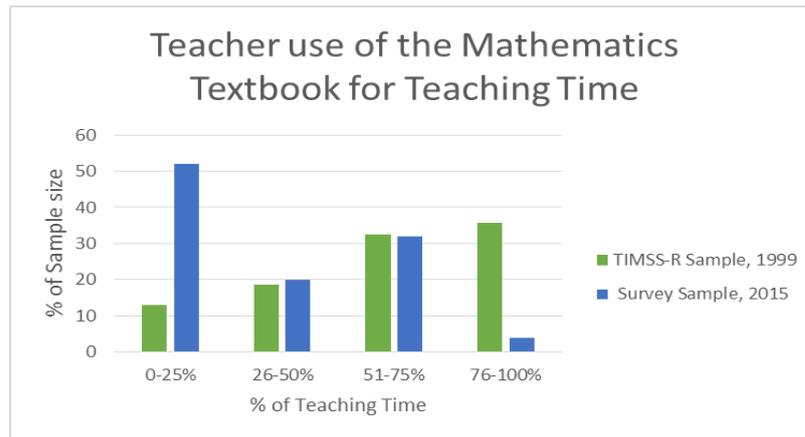


Figure 4. Breakdown of teacher use of mathematics textbooks for teaching time.

Participating teachers were also asked to identify how much they rely on specific resources for their mathematics lesson planning. Of the teachers who responded ‘quite a lot’ or ‘a great deal’, the most common resource was *student edition of a textbook*.

Role of Mathematics Textbooks

The questions used in the 2015 survey in relation to the ‘role of textbooks’ are adapted from the original TIMSS-R study. While these questions were included in the original study, they were not distributed to the teachers in England. Hence, there is no benchmark data from 1999 to compare with this sample data. When specifically asked what they are likely to use a textbook for, the top four answers were *selecting exercises* (24/31), *selecting problems* (23/31), *lesson planning* (15/31) and *creating teacher explanations* (8/31). Looking at planning in more detail, the 15 teachers who use textbooks as part of their planning process indicated that they use textbooks as a source of practice and extension questions, which suggests that textbooks are primarily being used for selecting exercises and problems. Similarly, four other teachers noted that they use textbooks for selecting tasks and activities and for practicing methods. Further analysis of this data doesn’t identify any statistically significant correlations (*Spearman Rank, as variables are not normally distributed*) between number of years teaching and amount of textbook use as presented in Figures 5 and 6 below. However, when use of textbook is controlled for (i.e. teachers who did not use a textbook were excluded from this analysis), the data does show a positive correlation ($r = 0.46$, $p = 0.02$) between amount of textbook use and the number of years of experience a teacher has.

TB use based on years of experience teaching Mathematics

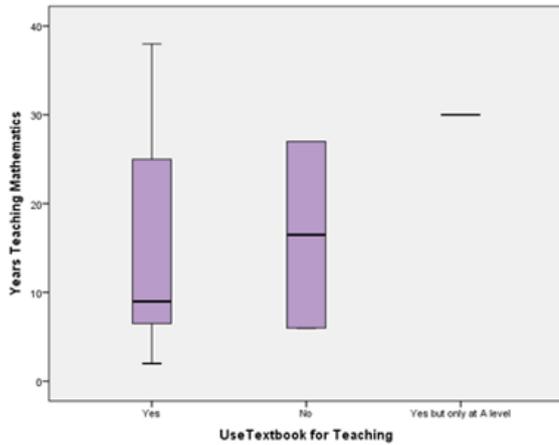


Figure 5: Textbook use based on number of years of experience teaching mathematics.

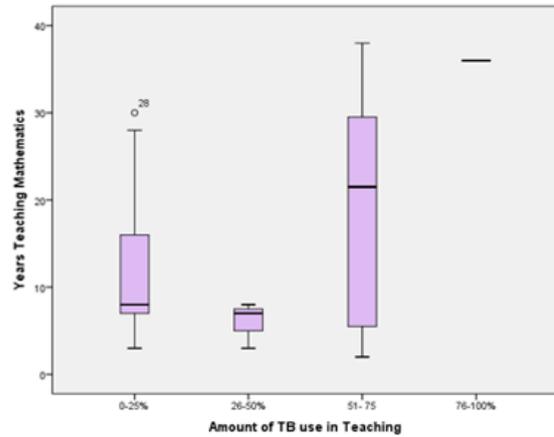


Figure 6: Percentage of teaching time for which a textbook is used, based on years of experience teaching mathematics.

Table 5 below reinforces the view that the participating mathematics teachers are using a variety of resources to support their teaching and planning. Further analysis of this data indicates there is a significant correlation between the likelihood of using a textbook for planning (assuming a teacher already uses a textbook in some way) and years of experience in teaching mathematics ($r = -0.43$, $p = 0.03$), suggesting that less experienced teachers are more likely to use a textbook for planning.

Table 5 TIMSS-R and Survey Sample Teachers' Use of Resources for...

	Sample	n	Other Resource Books	Student Edition of Textbook	Teacher Edition of Textbook	National Curriculum	National Curriculum Teacher Guidelines	Examination Guidelines	Other
a. deciding which topics to teach	1999	328	1.2%	6.7%	1.8%	69.5%	20.7%	0%	
	2015	31	3.2%	12.9%	3.2%	38.7%	0%	9.7%	22.6%
b. deciding how to present a topic	1999	320	29.4%	29.4%	20.3%	17.5%	3.44%	0%	
	2015	31	0%	25.8%	16.1%	6.5%	3.2%	0%	38.7%
c. selecting problems and exercises for work in class and homework	1999	325	17.9%	58.5%	14.5%	8%	1.2%	0%	
	2015	31	12.9%	41.9%	9.7%	3.2%	0%	3.2%	22.6%
d. selecting problems and applications for assessment and evaluation	1999	326	44.5%	11%	16.6%	22.1%	5.8%	0%	
	2015	31	6.5%	22.6%	9.7%	3.2%	0%	19.4%	29%

⁴Note: These percentages are rounded figures.

Use of Mathematics Textbook for Homework

In this section of the survey, the teachers were asked to outline how often they use worksheets, textbooks or reading tasks as part of their mathematics homework, the results of which are presented in Figures 7 and 8 below.

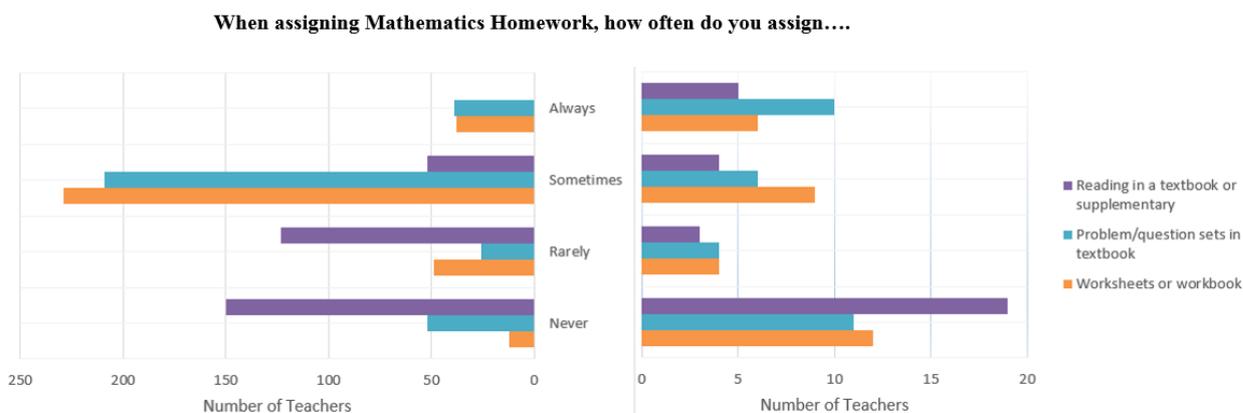


Figure 7: Frequency of Homework Tasks (1999)

Figure 8: Frequency of Homework Tasks (2015)

These figures suggest some differences in relation to the use of textbooks for setting homework. For example, no teacher from the 1999 study indicated that they always set reading tasks from a textbook for homework, in comparison to 5 of the 31 teachers from the 2015 sample. Also, the proportion of teachers who indicate that they never use problems and exercises from a textbook or from worksheets was greater among the 2015 sample of teachers. This data appears to suggest teachers are setting more reading tasks from a textbook and making less use of worksheets or workbooks for homework.

Discussion

Despite the concerns noted by Pepin and Haggarty (2001) regarding the availability of mathematics textbooks, Sturman et al., (2008) still recorded that 43% of Year 9 teachers used textbooks as their main resource and 46% used it as their supplementary resource, suggesting a total of 89% of Year 9 teachers used textbooks for a large portion of their work. However, contrary to this, and more reflective of Pepin and Haggarty's (2001) findings, the 2015 data indicates that the majority (18 out of 31) of teachers surveyed use a textbook for less than 50% of their teaching time (Figure 4), with 13 of the 31 teachers using textbooks for less than 25% of their teaching time. However, no strong correlations exist between age, qualification and years teaching mathematics when compared to the amount of textbook use for teaching mathematics. It is also important to note that we are cognizant of the limitations of this study due to the small sample size of teachers. Hence, we do not claim our findings are generalizable. However, the sample size is sufficient in addressing this research question and providing possible directions for further investigation.

While 28 of the teachers in the 2015 survey sample indicate they use a textbook in their teaching, two of the three teachers who indicate they don't use a textbook also acknowledge that they use a textbook for selecting tasks and activities for their teaching. This appears to be somewhat contradictory, however it is similar to Sturman et al.'s (2008) findings and those of Thomson and Fleming (2004) in relation to number of teachers who

regularly use a mathematics textbook. This suggests that facilitating/supporting planning is the most common role of a textbook. This is a role that positions a textbook to impact positively on teaching and learning (Rymarz & Engebretson, 2005). The data presented in Table 5 also suggests an increase in the use of a textbook for decisions about what to teach and for the selection of problems and applications for assessments and evaluation, 22.6% compared to 11% in 1999. Considering the views of Howson (1995) and Vincent and Stacey (2008), this could have a potentially negative impact on teaching and learning if the textbooks themselves are over-relied upon or lack sufficient challenge. Table 5 also indicates that the 1999 sample of teachers were most likely to use *The National Curriculum* (29.7% of all responses) or the *Student Edition of a Textbook* (26.4% of all responses), while the 2015 sample are more likely to use 'Other' (not book based), *Resources* (30.99%) or the *Student Edition of a Textbook* (28.3%). This suggests that textbooks are still a widely used resource but teachers are more likely to use the textbook as one of a range of supporting resources.

As well as having concerns about the availability of textbooks, Haggarty and Pepin (2002) later identified concerns about the role of textbooks in lesson planning and activities. They, along with Vale (2010), suggest that due to lack of time for planning, less experienced teachers are left to rely on a textbook for their planning. This suggests there is a need to ensure that early-career teachers, in particular, have access to good mathematics textbooks. This is supported by the data presented here which notes a negative correlation between teacher experience and use of textbooks for planning. In particular, the data suggests that teachers are using textbooks as a source of exercises and problems. Of the sample of 31 teachers, four use reading tasks from within their chosen textbooks and three note using textbooks to trigger student interest while none of the teachers indicate that they find textbooks a good source for providing students a historical context to the area of study. This data, depending on the textbook being referred to, could be interpreted as supporting the views of Henderson and Hudson (2010) and Vincent and Stacey (2008) who suggest that textbooks can provide a repetitive, procedural view of mathematics. Given the perceived role of a textbook to provide exercises and problems (as suggested by the data) it is easy to understand how some researchers suggest that the value of a textbook can be lost in a focus on repetition and memorisation of content. There also appears to be a shift in regard to textbook use for homework, in that more teachers are opting to include reading tasks and are making less use of worksheets in the 2015 sample. Which, given that Foxman (1999) made a link between teachers not setting reading tasks and students believing that they had to memorise a textbook or their notes to do well at mathematics, could impact positively on student attitudes to mathematics.

Summary and Conclusion

Much of the research to date places strong emphasis on the role of textbooks in unpacking the associated curricula (Howson, 1995; Schmidt et al., 1997; Valverde et al., 2002) while others highlight how mathematics textbooks can fall short of the intended curriculum (Zhu & Fan, 2006; O'Keeffe, 2014). The intention of this study was to gain a better understanding of the role of textbooks in English secondary and middle school mathematics classrooms. The guiding research questions were centred on the role of mathematics textbooks and how this may or may not have changed over time. As part of this, the study also sought to identify whether use of textbooks can be correlated with experience, qualification and/or confidence. Regarding the main resource used by teachers,

it appears that the selection of such a resource is dependent on the task at hand (see Table 5). For example, when deciding what topic to teach, the national curriculum tends to be the most widely used resource, with only one of the survey teachers noting they would not use the national curriculum. Textbooks tend to be a more common choice when it comes to selecting how to present a topic. However, the primary role of mathematics textbooks, as identified by the 2015 sample of teachers, is for lesson planning and selecting of exercises and problems.

Further to this, the data has indicated some differences in both the amount of use and reason for use of textbooks over time. The data suggests that fewer teachers are depending on textbooks for classroom teaching. Also, while textbooks are still seen as a resource for the selection of problems and exercises there is a move towards a more varied use of textbooks, with many teachers using a range of resources to supplement their textbook use. This is not surprising given the plethora of digital resources and technologies that are freely available and warrants further investigation. Areas of further exploration include which specific resources exist, which resources are noted by mathematics teachers as being most effective in supporting their teaching, and why, and how such resources are being used.

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