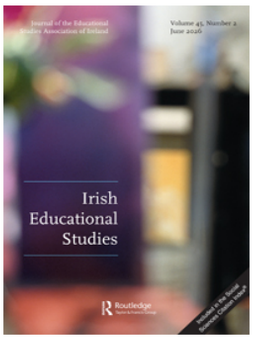

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Teachers' perspectives on Junior Cycle mathematics reform in Ireland

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ABSTRACT

Between 2014 and 2022 lower secondary education in Ireland was completely overhauled with the introduction of the Junior Cycle Framework. As part of this reform movement, a revised mathematics curriculum was introduced in 2018. To effectively evaluate educational reform efforts such as this, it is critical to ascertain teachers' perspectives on the changes introduced. As such, this paper seeks to evaluate the reformed Junior Cycle mathematics specification by exploring the perspectives of Irish mathematics teachers. Drawing on survey data from 196 teachers, we investigate mathematics teachers' beliefs regarding the necessity and effectiveness of the reform, as well as perceived strengths, weaknesses and areas for improvement. The findings highlight the importance of engaging teachers in the reform process to ensure successful implementation and sustained educational change, and offer suggestions and recommendations for future reform efforts. This paper is particularly timely, as reforms to Senior Cycle mathematics are currently being drafted.

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Mathematics curriculum; curriculum reform; teachers' perspectives; Junior Cycle mathematics

Introduction

This paper will provide insights into teachers' overarching perspectives on a reformed mathematics curriculum introduced at the lower secondary level in Ireland in September 2018. Curriculum reform involves making adjustments to educational programmes in order to improve student outcomes (Gilbert 2010). It can be driven by a political desire to improve student performance, to mitigate overcrowded curriculum and to meet the needs for a thriving economy at a given point in time (Gouëdard et al. 2020). Furthermore, reform can be seen as a mechanism to respond to '… *economic, demographic, political and social imperatives*' (Baş 2021, 21). According to Shimizu and Vithal (2023), mathematics curriculum reform can involve significant changes to mathematical content, recommended pedagogies, teaching resources and assessment. However, regardless of what motivates change or the nature of the change, researchers

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such as Davis (2003) and Anderson and Helms (2001) assert that reform efforts need to be evaluated in order to determine what constitutes effective reform and what obstacles impede it. Furthermore, Handal and Herrington (2003) argue that when evaluating curriculum reform efforts, it is critical that mathematics teachers' beliefs about different aspects of the curriculum are considered. This paper seeks to address these issues by ascertaining teachers' perspectives regarding the need for, and the strengths and weaknesses of a recent mathematics education reform in Ireland. However, first we will provide an overview of the nature of this reform and the rationale for it.

Overview of secondary education in Ireland and the Junior Cycle reform

Secondary education in Ireland is divided into two cycles. Junior Cycle is a three-year programme of study which students enter between the ages of 12 and 13. All students must complete these three years of schooling. Following on from this, students then progress to Senior Cycle. This is a two-year programme of study which students enter directly from Junior Cycle or after participating in a non-academic, optional 'gap' year aimed at promoting students' social and personal development, known locally as Transition Year. It is a recent reform at Junior Cycle which is the focus of this paper.

In 1989, the Junior Certificate was introduced. As part of this programme of study, students were required to study a minimum of 10 subjects from a possible 28 on offer. At the end of the three-year cycle each student would then sit a summative State examination in each of their subjects, known as the Junior Certificate. However, shortly after the Junior Certificate was introduced, issues were identified in relation to the misalignment between the curriculum goals and content and the way in which it was assessed through means of a summative examination (Gleeson 2024). While no immediate change was made, by 2011, other issues with the Junior Certificate had been identified. For instance, Irish PISA scores in 2009 were in decline and many believed that one potential cause for this was that the Junior Certificate was not serving its purpose in helping students to develop the skills necessary to succeed. In addition to this, research from Smyth et al. (2007) found that in each year of the Junior Certificate, students faced a different challenge. In first year, the challenge was the lack of academic progress made by students, while in second year, the main issue identified was the disengagement of learners. In third year, the summative examination dominated the minds of both students and parents, and the focus of learning narrowed significantly. These issues, coupled with the persisting '*… dysfunctional nature of the curriculum/assessment relationship*' (Gleeson 2024, 243), led to the publication of the *Towards a Framework for Junior Cycle* document in 2011 (NCCA 2011), which identified the need for educational reform at lower secondary level (Printer 2020).

Following this publication and a public consultation process, the Department of Education and Skills launched *A Framework for Junior Cycle* in 2012 (DES 2012). The key changes proposed in this framework included more choice and flexibility for schools to decide the programme of study they wished to offer at Junior Cycle; a greater emphasis on skills and learning outcomes; and a shift towards a school-based model of assessment. The increased level of flexibility came about with the introduction of short courses. It was proposed that each of the 21 subjects on offer would have an accompanying subject specification that would replace the old curriculum documents, and, in addition to these

subjects, schools could also offer short courses to students. A number of these short courses would be developed by the National Council for Curriculum and Assessment (NCCA), the government agency tasked with curriculum design in Ireland, while schools were also encouraged to develop their own short courses to reflect their own context and to meet the needs of students in their school (DES 2012). In relation to the emphasis on skills and learning outcomes, the 2012 Framework proposed 24 statements of learning describing what students should '*know, understand, value and be able to do*' on completion of their first three years in secondary education (DES 2012, 5). These statements were then underpinned by eight principles[1] and eight key skills.[2] Each of the aforementioned subject specifications would also contain a list of subject-specific learning outcomes and the statements of learning and key skills would be embedded in these outcomes (DES 2012). Regardless of the programme of study for Junior Cycle implemented, every school was to be responsible for ensuring its offering reflects the key skills and statements of learning as outlined in the 2012 Framework. Finally, the 2012 Framework outlined a significant change to assessment at Junior Cycle. According to Gleeson (2024), assessment in secondary schools in Ireland had, to that point, remained largely unchanged with terminal examinations being the primary mode of assessment. However, the 2012 Framework proposed a shift towards a '*school-based model of assessment*' (DES 2012, 3). The model of assessment proposed in 2012 would, for each subject, involve a schoolwork component based on the work undertaken by students in their second and third years of Junior Cycle and a final assessment of subjects at the end of the three years of Junior Cycle. The 2012 Framework proposed that the schoolwork component would be worth 40% of the overall marks for a subject and would be marked by teachers, while 60% would be awarded for the final assessment, which would be set by the external State Examinations Commission [SEC] but administered and marked in the school by teachers.

While the 2012 Framework involved change on many fronts, it was the change to assessment that was met with most resistance. Gleeson, Klenowski, and Looney (2020) outlined how this shift to school-based assessment was met with unrelenting resistance from teacher unions. This resistance, coupled with what Printer (2020) described as public pressure and the threat of industrial action, led to a lengthy mediation process which resulted in the revised *Framework for Junior Cycle* being published in 2015. The 2015 Framework was similar to that published in 2012 with the shift towards increased flexibility and an outcomes-based curriculum still featuring, but it did contain a new model of assessment. While the model of assessment remained focused on supporting student learning, and continuous assessment by teachers was still a key feature of the Framework (DES 2015), teachers were no longer required to assess their own students for certification purposes. Instead, students would now engage with two Classroom Based Assessments [CBAs] for each subject which would allow them to demonstrate their understanding and skills in that subject area. Teachers would be responsible for evaluating and reporting on students' performance in these CBAs but they would not contribute to a student's final grade in a subject. Instead, a written assessment task, based on the second CBA, would be designed and marked by the SEC and this would be worth 10% of students' final grade. The remaining 90% of a student's grade would be obtained through a state-certified, externally set and assessed examinations in each subject studied. While this was a significant departure from the 60:40 model proposed

in 2012, the 2015 Framework still outlined how it was important to '… *see the state certified examination as one element of a balanced, broader approach to assessment*'. As a result of these changes, the 2015 Framework for Junior Cycle was broadly welcomed by all stakeholders and was rolled out on a phased basis, with new specifications for different subjects being introduced over a five year period. By September 2019 all revised subject specifications had been introduced at first year.

Mathematics at Junior Cycle

The revised mathematics curriculum at Junior Cycle was introduced to first year students in 2018. The revised Junior Cycle Mathematics curriculum is designed to equip students with essential mathematical knowledge, skills and ways of thinking that support lifelong learning, problem-solving and informed decision-making in personal, social and work contexts. It reflects a view of mathematics as an evolving, interconnected discipline that underpins learning across subjects and empowers students to engage critically with a technologically advancing and data-driven world (see: www.curriculumonline.ie). Under the Junior Cycle reform, mathematics is now one of three subjects deemed compulsory, along with English and Irish. While all other subjects are offered at a common level, these three compulsory subjects are offered at two levels, higher-level and ordinary-level. Higher-level is the most challenging level while ordinary-level entails the study of similar concepts but with reduced levels of detail and difficulty. Prior to this reform, mathematics at Junior Cycle had also been offered at foundation-level to accommodate those students who struggled with ordinary-level mathematics; however, this option was removed under the 2015 Framework. It was also recommended for the three compulsory subjects to be taught over 240 h across the three years, compared to a recommendation of 200 h for all other subjects. The reform resulted in very little change to the mathematics content to be taught with the four content strands of Number; Geometry and trigonometry; Algebra and functions; and Statistics and probability remaining unchanged. However, there was also a unifying strand introduced that permeates all other strands. There is no specific content linked to this strand, instead its learning outcomes underpin all other strands in the curriculum.

As with all subjects, students must complete two CBAs in mathematics. The first of these, which takes place in second year, involves a mathematical investigation. The second CBA, scheduled to take place in third year, involves a statistical investigation and it is this statistical investigation that the assessment task, worth 10% of students' final mathematics grade, is based. Finally, students are also required to sit a terminal state examination in the subject of mathematics. A different examination paper is designed for higher- and ordinary-level students (DES 2015); however, regardless of the level chosen, each student is required to sit only one mathematics examination paper. This too is a significant change, as prior to 2018 the Junior Certificate mathematics examination consisted of two papers which students would sit over the course of two days. As was the case for all subjects, the reform of mathematics at Junior Cycle was significant, and the revised subject specification set out ambitious goals and targets for the teaching and learning of mathematics. However, if these goals and targets are to be realised, teachers have a critical role to play.

The role of mathematics teachers' beliefs in curriculum reform

The success of curriculum reform is heavily dependent on teachers as they are the agents tasked with implementing the changes in the manner envisaged by policymakers and curriculum designers. In fact, Datnow and Castellano (2000, 777) determined teachers to be the '*centerpiece*' of any reform movement. However, according to Fullan (2001), meaningful educational change depends not only on what teachers do or what they know, but also on what they think and believe. It is therefore unsurprising that research has shown that teachers' beliefs can serve to accommodate or inhibit a reform movement (Handal 2003). For example, according to Handal and Herrington (2003), if teachers' beliefs are compatible or aligned with the reform movement, then it is much more likely that such reform efforts will be enacted as envisaged by those responsible for the design of the revised curriculum. However, the opposite is also true. Anderson and Piazza (1996) argued that if teachers' beliefs are not aligned with the values underpinning curriculum reform then such beliefs will create a barrier or obstacle for the reform movement. Such issues are particularly pronounced in the subject of mathematics (Battista 1994; Handal and Herrington 2003). Yang et al. (2020) found that when mathematics teachers held dynamic beliefs about the subject, they were better positioned to engage in a variety of constructivist teaching practices, as espoused by reformed curricula worldwide. However, there has been longstanding acknowledgement that teachers often view mathematics in a rigid or static manner and this stance may lead to many teachers resisting any curriculum reform that promotes the development of conceptual understanding or problem-solving (Ernest 1989; Prawat and Jennings 1997).

This research highlights the critical role that teachers' beliefs play in the rollout of curriculum reform. Researchers have shown that we need to understand teachers' beliefs on educational reform as it is these beliefs that '*influence their motivation to change their own professional practice and achieve the goals of the reform*' (Baş 2021, 22). As such it is paramount that the perspectives of teachers are considered in both the development and evaluation of curriculum reform, as their belief and practices mediate between the intended and implemented curriculum. However, van Veen and Lasky (2005) concluded that educational reform evaluations rarely tend to consider or address teachers' beliefs regarding curriculum change. Likewise, in Ireland, where this study is set, Printer (2020) asserted that during previous reform efforts in the Irish education system, very little was done to ascertain teachers' views on the reform movements. To date in Ireland teachers' attitudes to the Junior Cycle reform have been captured in the work of McGarr et al. (2023). They found that the majority of teachers believed that reform was necessary at Junior Cycle and were positively disposed to many features of the Junior Cycle framework including the emphasis placed on wellbeing, increased student engagement through the CBAs and the inclusion of clear and specific learning outcomes. However, they also reported how many teachers had reservations. Teachers in this national study cited concerns with the common level approach to the majority of Junior Cycle subjects; the volume of CBAs that students had to complete and the low weighting of the assessment tasks; and the width of some of the new grading bands introduced as part of this reform effort. While this study was not specific to mathematics, research conducted by Neururer and Ní Shuilleabhain (2022) investigated teachers' concerns and attitudes towards specific aspects of the revised mathematics curriculum. In

their study, they conducted interviews with 16 secondary mathematics teachers to ascertain their views on the CBAs introduced as part of the reform. Their study showed that teachers felt the overcrowded curriculum and lack of time to conduct CBAs was having a detrimental effect on how these learning opportunities were being experienced by both teachers and students. Despite this research, no study has specifically considered teachers' beliefs and attitudes towards the revised Junior Cycle mathematics curriculum at a national level. This study seeks to rectify this by addressing the following research questions in relation to the revised Junior Cycle mathematics curriculum:

1. To what extent do mathematics teachers believe there was a need for reform at Junior Cycle, and are they supportive of the reform efforts?
2. What do mathematics teachers consider the main strengths and weaknesses of different dimensions of the reformed curriculum to be?
3. What changes, if any, do mathematics teachers believe are necessary to improve the Junior Cycle mathematics specification in the future?

Theoretical perspectives

Prior to outlining the methodology employed to address these research questions, the authors wish to provide an overview of the theoretical perspectives underpinning this study. The theoretical perspectives come from the work of Glatthorn et al. (2019) and Memon (1997). When conceptualising the intentional curriculum, that is the ideological goal of the curriculum (Herbel-Eisenmann 2007), Glatthorn et al. (2019) identified four pillars that constitute this type of curriculum, namely the *written* curriculum, the *supported* curriculum, the *taught* curriculum and the *tested* curriculum. The written curriculum is defined as the written document that outlines the rationale underpinning the intended curriculum, provides an overview of the goals it seeks to achieve, and the learning objectives to be mastered. It is considered a comprehensive and specific document. The supported curriculum refers to the resources available to support and deliver the intended curriculum. Glatthorn et al. (2019, 12) contends that '… *the supported curriculum [has] a major bearing on what and how much is learned*'. The next dimension of the intended curriculum is labelled the taught curriculum and this refers to the curriculum that is actually delivered in the school setting. It essentially refers to how an outsider would view the curriculum being implemented through the actions of the teacher. The final dimension of the intended curriculum is the assessed or tested curriculum, and refers to aspects of the curriculum that are assessed by both formative and summative means.

While Glatthorn et al. (2019) discuss the different pillars of the intended curriculum, all of which can be modified during curriculum reform, Memon's (1997) framework speaks to the enablers and barriers of effective curriculum reform. Memon (1997) constructed an extensive list of factors affecting curriculum change, classifying them as *curricular*, *instructional* and *organisational*, in order to derive a theoretical framework to reduce teacher resistance and improve the process of curriculum change. According to Memon (1997), curriculum related factors include a lack of clarity around the changes to the curriculum, incompatibility between the intended and the implemented

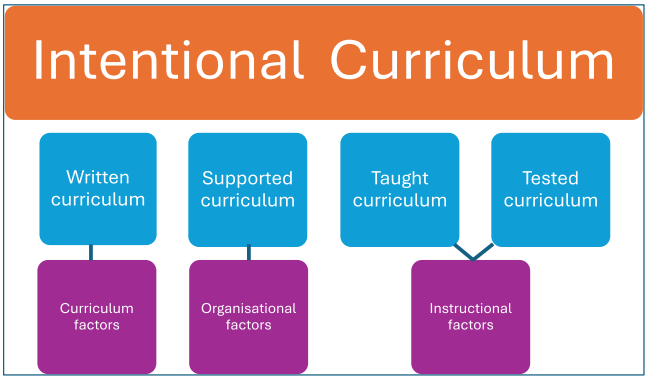

Figure 1. Theoretical framework (based on the models of Memon (1997) and Glatthorn et al. (2019).

curriculum, and the curriculum users' needs not being addressed. As such, these factors very much relate to the written curriculum pillar. Deficiencies in content and pedagogical knowledge, lack of professional development and examination-led teaching are categorised by Memon (1997) as instructional factors. From this description, it is evident that such factors affect the taught and tested curriculum. Finally, physical resources that may act as barriers to change are deemed to be organisational factors and so relate to the supported curriculum.

When considering teachers' perspectives on curriculum reform, the authors believe that all aspects of the intended reformed curriculum need to be considered, and the enablers and barriers affecting each of these pillars need to be explored. As such, both Memon's framework (1997) and Glatthorn et al.'s (2019) definition of the intended curriculum were merged to form the theoretical framework that informed the design of the research instrument and the data analysis in this study. This framework is depicted in Figure 1.

Figure 1 highlights the alignment between Glatthorn et al.'s (2019) model of the intended curriculum and Memon's (1997) enablers and barriers for curriculum change. It therefore provides a coherent framework for examining both the structural components of the curriculum and the processes through which reform is enacted. Integrating these frameworks in this way highlights how the written, taught, tested and supported dimensions interact within broader reform contexts, and can therefore be used in the design of a research instrument that seeks to ascertain teachers' perspectives on the reformed Junior Cycle curriculum and the subsequent data analysis phase.

Methodology

This paper examines Junior Cycle mathematics teachers' attitudes towards the reform of the Junior Cycle mathematics curriculum, exploring perceived strengths and limitations of the reform, as well as their perspectives on potential future amendments to the Junior Cycle mathematics curriculum. It is part of a wider study that considers not just teachers' perspectives of the strengths and limitations of the reform but also how they believe the new curriculum has impacted on their teaching practices and on student learning; their perspectives on the significant changes made to the tested curriculum (see Prendergast

and O'Meara 2026) in addition to what they perceive as the main enablers and barriers to the successful implementation of this particular curriculum reform. In order to gather insights into teachers' views of these different aspects of the reform, an online survey, informed by was designed for distribution to all Junior Cycle mathematics teachers in the Republic of Ireland. As demonstrated in Table 1, each section of the survey and each question within these sections were informed by at least one dimension of the intentional curriculum (written, supported, taught and tested) and one or more of the enablers and barriers (curriculum, organisational and instructional). For example, Section C focuses on the impact of the reform on teaching and teaching practices so the questions in this section considered teachers' perspectives on (a) the taught curriculum and (b) the instructional factors that they perceive to impact on their ability to teach the curriculum as intended. An online survey was deemed to be the most appropriate research instrument for a study of this nature as it was easy to distribute to a large sample; allowed the research team to ensure participants' anonymity; was cost effective; and not too time consuming to complete (Van Selm and Jankowski 2006). The survey was developed with the help of a Teacher Research Advisory Group [TRAG]. The TRAG consisted of eight mathematics teachers (five female and three male), all of whom taught mathematics at Junior Cycle, and a mathematics teacher educator. All members of this group were experienced in their positions, with the number of years of teaching experience ranging from 11 to 35 years. All members of the TRAG were recruited using a purposive sampling method i.e. all members were known in some capacity by one or both authors. Members of the TRAG were invited to participate on the basis of the expertise they could bring to the research based on their extensive experience of teaching mathematics at Junior Cycle and the contemporary issues they have in similar peer groups to the research participants. The TRAG reviewed the initial draft of the survey and offered feedback to the research team. After their concerns and queries were addressed, a second draft of the survey was developed and piloted among members of the TRAG to ensure all questions made sense, were easy to follow, and were in no way ambiguous or leading. At this point we also asked members of the TRAG to consider if the survey questions allowed us to address the research aims guiding the wider study. In total, the final version of the survey contained six sections. A descriptor of each section as well as its link to the theoretical framework is provided in Table 1.

In order to address the aforementioned research questions, we will report on the findings collected in response to the questions posed in Section B of the survey.

The population for this study was all teachers of Junior Cycle mathematics at secondary level in Ireland. As the study involved human participants, ethical approval was

Table 1. Overview of Online Questionnaire

Section descriptor	Link to theoretical framework
Section A: Demographics	N/A
Section B: Teachers' overarching perspectives of the reform	Written curriculum – curriculum factors Supported curriculum – organisational factors Taught curriculum – instructional factors Assessed curriculum – instructional factors
Section C: Impact of reform on teaching and teaching practices	Taught curriculum – instructional factors
Section D: Impact on student and student learning	Taught curriculum – instructional factors
Section E: Assessment	Tested curriculum – instructional factors
Section F: Enablers and barriers to curriculum reform.	Supported curriculum – organisational factors

sought and granted by the EHS Research Ethics Committee at the University of Limerick (Approval Number: 2024_10_15) To reach as many members of the population as possible, the online questionnaire was distributed using a non-probability sampling method. The survey link was emailed to all national branches ($n = 7$) of the Irish Mathematics Teachers' Association (IMTA), and they were asked to share it with their members[3] Following this request, the IMTA shared the link on their social media pages, which has over 3500 members and individual branches also sent it to their members. The survey was also shared with mailing lists of graduates of mathematics teacher education programmes from four of the seven Higher Education Institutes in Ireland who offer teacher training programmes for the subject of mathematics. The online link was open over a 3-week period in November 2024 and 196 mathematics teachers responded. Of these 196, 64 (32.7%) were male compared to 132 (67.3%) females. This gender breakdown is in line with that for all post-primary teachers in Ireland, as in 2022 the Teaching Council reported that 31.6% of post-primary teachers were male with 68.3% being female. 46 (23.5%) teachers reported teaching in a DEIS school compared to 150 (76.5%) in non-DEIS[4] settings. Finally, using Berliner's (2004) model, 38 (19.4%) teachers were classified as 'novice'[5] teachers while the remaining 158 (80.6%) were considered 'expert' teachers.

As mentioned previously, Section B of the survey is the focus of this paper, and it contained a mix of Likert-scale and open-ended questions; hence, yielding a mix of both quantitative and qualitative data. The Likert-scale questions, which produced quantitative data, provided information on teachers' levels of agreement with a number of statements ($n = 4$) in relation to the need for curriculum reform and their perceptions of the effectiveness of the reform effort. This data was recorded in SPSS (Version 26.0). These Likert-scale statements were not designed by the authors to combine into a summated rating scale and responses to each item were analysed individually using descriptive statistics. Estimating the reliability of scores on single-item measures can be difficult because commonly used internal consistency estimates of reliability cannot be calculated (Lucas and Brent Donnellan 2012). Thus, some caution must be applied to the interpretation of these quantitative findings. Section B also contained three open-ended questions, which sought to garner teachers' beliefs on the strengths (Describe what you would consider to be the main strengths of the Junior Cycle Mathematics Specification [JCMS].), weaknesses (Describe what you would consider the main weaknesses of the JCMS), and areas for improvement of the reformed Junior Cycle mathematics curriculum (If you had the chance, what immediate changes would you make to the JCMS and why?). The data from these open-ended questions were transcribed into NVivo and analysed using a hybrid-thematic analysis approach. This approach, according to Proudfoot (2023), combines inductive analysis, whereby themes emerge organically from the data, with deductive analysis, whereby a set of themes are pre-determined based on the tenets of the theoretical framework. Such an approach to analysing qualitative data allows for greater rigour (Fereday and Muir-Cochrane 2006) and transparency (Yuwono and Rachmawati 2023). The approach adopted first involved using Braun and Clarke's (2022) framework for inductive analysis. The six steps in this process are described below:

1. Become familiar with the data: This was achieved through thorough reading of the responses to the three open-ended questions.

2. Generate initial codes: The initial codes were generated independently by both authors. Some of the codes generated at this stage relating to the strengths of the reform movement were 'broad course', 'lots of variety', 'different strands of mathematics'.
3. Search for themes: Initially, themes were generated from the codes independently by each author. For example, the three codes identified above were categorised into the theme 'Variety and breadth of the curriculum'.
4. Review themes: At this stage, the two authors came together to compare the themes they had generated. While there were no major differences in the themes generated, there were some differences in how themes were labelled and how some responses were then categorised. Therefore, in order to achieve richer interpretations of the data some themes were relabelled and others recoded. As a result of this process, 15 themes were generated relating to the strengths of the reform movement; 12 themes in relation to its weaknesses; and 11 themes relating to the changes teachers would like to see made to the reformed curriculum.
5. Define themes: At this stage, the two authors again worked together to refine the themes identified in Step 4. Upon review, it was decided that one theme identified in relation to the changes teachers would like to see made, initially labelled 'changes to assessment', was too broad and this was split into two themes, namely 'changes to formative assessment' and 'changes to summative assessment'. As a result of this, there were a total of 12 themes identified relating to the changes teachers would like to see made to the reformed curriculum.
6. Write up: The final write-up was completed by both authors.

This approach was both flexible and recursive and, as demonstrated, involved repeated movement back and forth as initial codes were identified by the authors, and themes were generated, reviewed and finalised. Once steps 1–5 had been completed the authors then organised the themes against the theoretical framework described in Figure 1. This approach led to the generation of the final set of themes. Each theme was then named, and the authors ensured that they were mutually exclusive, internally coherent, and distinctive. The final themes will serve to address the research questions and will be presented in the next section.

Findings

The first research question sought to determine whether mathematics teachers believed there was a need for reform at Junior Cycle, and if they were supportive of the reform effort in their subject. In order to address the first part of this research question teachers were asked to rank their level of agreement on a five-point Likert scale, from strongly agree to strongly disagree, with the statement *There was a need to reform the previous Junior Certificate mathematics curriculum.*

The analysis shows that over half of the mathematics teachers surveyed (55.1%) did not believe (i.e. disagreed or strongly disagreed) that there was a need for reform of the Junior Cycle mathematics curriculum. On the other hand, 26% agreed that this reform was necessary. In addressing this research question, the authors also sought to determine if the responses differed depending on (a) gender; (b) DEIS status of

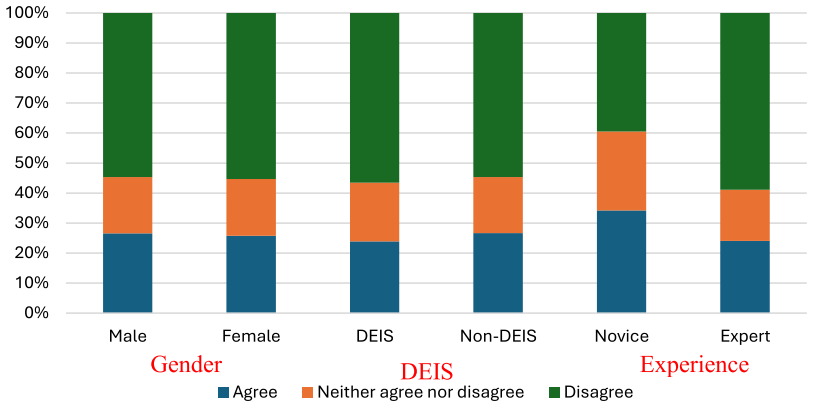

Figure 2. Differences in responses across gender, DEIS and experience.

schools respondents teach in; and (c) experience of teachers. The results are presented in Figure 2.[6]

No differences were noted in response to this statement across gender or from teachers in DEIS or non-DEIS schools. However, notable differences were recorded in the responses of novice and expert teachers. For example, 58.9% of expert teachers disagreed that there was a need for curriculum reform at Junior Cycle compared to 39.4% of novice teachers. In order to test if this difference was significant a Mann Whitney U test was conducted due to the fact that the dependent variable generated ordinal data and there were two mutually exclusive groups to consider. This test showed that the differences in responses between novice and experienced teachers were statistically significant ($U = 2434.5$, $p = 0.044$).

The latter part of the first research question required the authors to determine if mathematics teachers were supportive of the Junior Cycle reform effort in their subject, which was introduced in 2018. In order to address this, teachers were asked to rank their level of agreement with the statement, *I am supportive of the reformed Junior Cycle mathematics specification.*

A very similar picture emerged when the responses to this statement were considered. Just over one-fifth (22.5%) of teachers agreed that they were supportive of the reform effort but more than double that figure (53.1%) disagreed with this statement. Again, the authors wished to see whether the responses differed across gender, DEIS status or level of experience and so another cross-tabulation analysis was conducted. The results are presented in Figure 3.

For the statement *I am supportive of the reformed Junior Cycle mathematics specification*, the differences between novice and expert teachers were again noticeable, but not as stark as for the previous statement. In this instance, 42.1% of novice teachers disagreed with the statement compared to 55.7% of expert teachers. However, for this statement, a more pronounced difference was noted across gender, with males appearing to be less supportive of the reform effort (62.5% of males disagreed with the statement compared to 48.5% of females). However, a Mann Whitney U test showed that neither of these differences were significant (Gender: $U = 3656.0$, $p = 0.093$; Experience: $U = 2618.0$, $p = 0.178$). In order to explain why a large majority of teachers were opposed to the

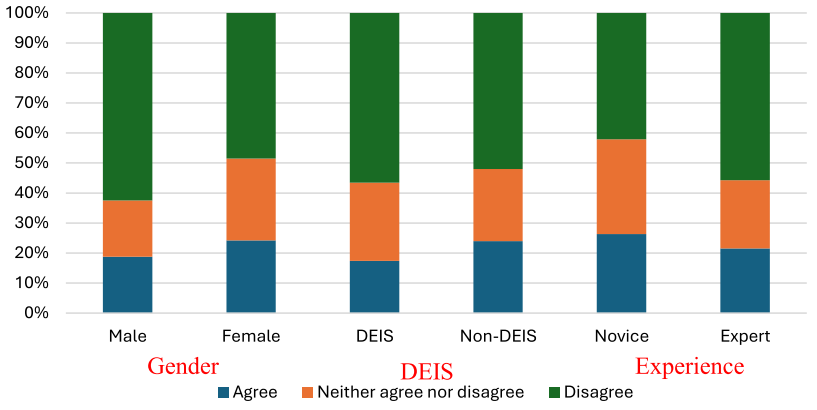

Figure 3. Differences in responses across gender, DEIS and experience.

reform effort, the authors analysed teachers' perceptions of the main strengths and weaknesses of the reformed Junior Cycle Mathematics curriculum, as well as adjustments they believe should be made to further improve the reform effort. This allowed them to address the second research question also. In relation to the perceived strengths of the reform effort, 161 teachers offered a response and 214 different strengths were identified, albeit the most commonly cited theme was that teachers ($n = 76$) couldn't find a benefit of the reformed curriculum. In total, these strengths were categorised into 15 themes and the five most popular themes are provided in Table 2, along with sample responses that fit under each theme.

Of the 214 'strengths' identified, the most common theme was *Can't provide a strength* with the majority of teachers ($n = 76$) in this study struggled to articulate a single perceived strength of the reformed curriculum. This would suggest that teachers hold quite negative beliefs about the reformed curriculum and the consequences of this will

Table 2. Perceived strengths of the reformed Junior Cycle mathematics specification,

Theme (dimension of theoretical framework)	*n*	Sample responses
Couldn't provide a strength/said none (N/A)	76	T34: Nothing that the previous curriculum didn't already offer T58: I find it hard to find any, students are not adequately prepared for senior cycle mathematics or have a strong foundation in the fundamentals of the subject for senior cycle.
Variety and breadth of the curriculum (*Written curriculum*)	20	T39: Variety of topics. T163: A broad course allowing students to touch on a wide area of topics.
Encourages problem solving (*Written curriculum*)	19	T150: The math course lends itself to lots of discovery learning and problem solving. T195: Problem solving for higher achieving students. It works well and there's plenty of opportunities to do this throughout the course
Highlights the interconnected nature of mathematics (*Written/Taught curriculum*)	16	T5: … linking of mathematical concepts rather than teaching maths as standalone sections T70: The JCMS is beneficial in linking like topics together rather than the discrete 'chapter' based system where continuity was at times haphazard at best,
Appropriate content (*Written curriculum*)	15	T24: Content suits the vast majority of students over the two levels. There is suitable progression from Primary to Post Primary. T33: Good curriculum content.

be discussed in the next section. Despite this, it is evident from Table 2 that some teachers are satisfied to some extent with aspects of the reform, particularly in relation to the written curriculum. For example, teachers acknowledged that there was a good variety of topics on the revised curriculum and that problem solving was at the heart of it. They felt this was something to be commended. Furthermore, 7.6% of teachers believe the content described in the written curriculum is appropriate and allows for a smooth transition from primary to secondary mathematics.

This research also sought to determine, from the perspectives of teachers, the weaknesses of the mathematics reform. To glean this information, teachers were presented with an open-ended question where they were required to articulate what they saw the main weaknesses of the reform effort to be. In total, 183 teachers responded to this question and 286 weaknesses were identified. These weaknesses were categorised into 12 different themes and the five most common themes are presented in Table 3.

Table 3 highlights that teachers identified weaknesses in all four aspects of the intended curriculum. The tested curriculum appears to be where the majority of teachers identified weaknesses, with 42.3% of the sample identifying assessment as an area of weakness. Those that identified assessment as an area of weakness tended to refer to both formative and summative assessment as being problematic. In addition to issues

Table 3. Perceived weaknesses of the reformed Junior Cycle mathematics specification.

Theme (dimension of theoretical framework)	*n*	Sample responses
Assessment (*Tested curriculum*)	83	T29: The CBAs and the lack of a decent examination at the end to assess their mathematical ability. T106: CBAS are absolutely terrible. 2 h exam not enough by far. Exam questions usually far too easy or too abstract. Grading system is a joke - Merit for 55% to 75%. Students way less engaged – they want their proper grades. Strongest students not pushed at all with this exam.
Insufficient preparation for Senior Cycle (*Taught curriculum*)	48	T31: the jump from third to fifth year is too big now with the new programme. T53: Students who struggle with algebra, for example, have discovered they can skip these questions and still pass … This means students are going into 5th year with very little subject knowledge and are really struggling with the demands of senior cycle. This is occurring at both HL and OL. The solution is not to lower the standards of the LC but to restore the standards at JC.
Issues with content (*Written curriculum*)	42	T115: It's been over simplified, and dumbed down. It is not challenging for the top students. T70: … Moving from a single paper with less than 20 min (recommended time) of Algebra to a 5th Year course heavily dependent on a competency with Algebra is leaving students struggling.
Lack of time (*Supported curriculum*)	24	T18: … ..also time on the teaching timetable is too minimum … the exam changed but the course content did not … not that I would change the content. T111: Less time to implement the teaching with very minor alterations in the content. Less time due to CBAs and also with more hours being allocated to WellBeing, hours have been cut from all core subjects.
Not suitable for all learners (*Taught curriculum*)	24	T43: Ordinary Level is far too challenging for many students – a significant cohort is unable to engage in any meaningful way with large chunks of the course, but are also not suited to doing Level 2. Even students who can pass the Ordinary Level exam are unable to meaningfully engage with large parts of the curriculum … T148: Doesn't promote a work ethic for senior cycle maths. As it is so achievable the better students are happy to float on through to senior cycle without testing themselves.

with the tested curriculum, teachers reported weaknesses in the taught curriculum. These weaknesses related to the fact that many teachers did not feel the taught curriculum was suitable for all students and felt that students '*at the extreme ends of the curve*' (T34) were particularly affected. Furthermore, when discussing the suitability of the reformed curriculum, teachers reported that they did not feel that it adequately prepared students for Senior Cycle. They believed that the 'dumbing down' of the course meant that students were then ill-prepared entering the final two years of secondary education, particularly in the strand of Algebra. This concern was further highlighted through the analysis of teachers' responses to the statement: *The reformed Junior Cycle mathematics specification effectively supports students in the transition from Junior Cycle mathematics to Senior Cycle mathematics*. The findings are presented in Figure 4.

Figure 4 highlights that more than four in every five teachers disagreed that the reformed Junior Cycle is effectively preparing students for mathematics at Senior Cycle.

Weaknesses were also identified by teachers with regard to the written curriculum, with key concerns focusing on the over simplification or dumbing down of the specified content, the lack of emphasis on algebra in the specification, and the content that was removed from the curriculum as part of the reform movement. Finally, the supported curriculum was also identified by teachers as problematic, with the main issue being the time allocated to teaching the curriculum. Teachers reported that the introduction of CBAs, coupled with additional time required for other core aspects of the Junior Cycle Framework (e.g. wellbeing), meant that the time available to deliver mathematics at Junior Cycle was diminishing and this presented another obstacle to the successful implementation of the revised curriculum.

Having identified the strengths and weaknesses of the reformed mathematics curriculum from the teachers' perspectives, the third research question sought to identify the changes teachers perceived necessary in order for the Junior Cycle mathematics curriculum to facilitate the effective teaching and learning of mathematics. To address this research question the survey asked teachers to identify what immediate changes they deemed necessary in order for the reform to be considered effective. In total, 185 teachers offered one or more suggested changes, resulting in 271 changes being advocated. These were categorised into 12 themes with the top five themes presented in Table 4.

In the main, teachers proposed changing the tested curriculum and the written curriculum. The two most frequently suggested changes related to the tested curriculum, as did the fifth most common response, and this is unsurprising given the number of teachers that identified weaknesses in this aspect of the curriculum. Teachers first outlined the need to change the CBAs. The majority of teachers ($n = 61$) who proposed this change suggested removing the CBAs completely from the mathematics specification. However, others offered more nuanced proposals. For example, a number of teachers ($n = 23$)

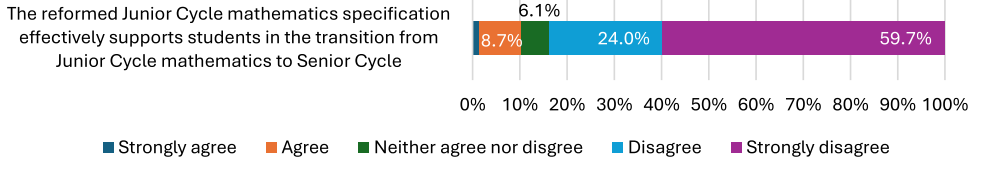

Figure 4. Teachers' perspectives on whether the Junior Cycle prepares students for Senior Cycle.

Table 4. Immediate changes that teachers would make to the reformed curriculum.

Theme (dimension of theoretical framework)	*n*	Sample responses
Desire to change the CBAs (*Tested curriculum*)	96	T10: Scrap Classroom Based Assessments. These take far too much time while accounting for nothing. They do not help build mathematical fluency and stress pupils out. T75: I would change the CBAs to be worth 15% each as part of students' final grade and gave it externally assessed by the SEC. By having it worth something then it would be more meaningful to both students and teachers. Teachers would then have to enhance their pedagogy from day 1 to meet the aims of the specification. T103: Get rid of the CBAs, or at least permanently change it to 1, students are under a lot of pressure with 2 CBAs in all subjects and puts teachers under pressure to finish courses
Desire to change summative assessment (*Tested curriculum*)	60	T48: Additional paper to give larger topics proper scope for questioning T74: The exam dictates the learning done in class … The exam should assess both problem solving word heavy questions, but pure math skills should be made important in exams to prepare students for LC
Desire to change content (*Written curriculum*)	35	T119: Shorten course. The ideal classroom has students engaged in self-discovery of maths. In mixed ability classes, along with AEN students, this takes time. Our course is too long. T136: Make the link from JC to SC maths more compatible. Stop simplifiying down some topics. T178: I would add more difficult algebra to Higher Level in order to prepare pupils for leaving cert.
Desire to reintroduce Foundation Level (*Written curriculum*)	25	T20: Bring back the 3 levels again huge disparity in students attainment and ability. T110: … reintroduce a foundation level paper … The weak students that need a foundation paper are lost in the ordinary level classes and they can never achieve at the ordinary level.
Desire to revise grading scheme in place (*Tested curriculum*)	24	T47: The grade descriptors should be in bands of 15, so upwards from 85 would be a Distinction T148: Change the grading brackets to encourage more of a work ethic

suggested reducing the volume of CBAs from two to one, while others ($n = 12$) suggested reconceptualising the CBAs so that they are held in higher esteem and more heavily weighted in the calculation of a students' final Junior Cycle mathematics grade. The second most common suggestion, again relating to the tested curriculum, was in relation to changes to the summative examination. The primary change called for the reintroduction of two papers to ensure a more comprehensive assessment of students' mathematical knowledge, understanding and skill. However, other changes such as a stronger emphasis on skills in the examination, more choice on the examination paper, and greater levels of challenge were also suggested. The third change proposed to the tested curriculum was not specific to the mathematics curriculum but rather the Junior Cycle Framework as a whole. Teachers in this study advocated for a change to the grading bands. When first introduced, and at the time this study was conducted, the Junior Cycle Framework outlined five different grading bands (Distinction [90–100%]; Higher Merit [75–89%]; Merit [55–74%]; Achieved [40–54%]; Not Achieved [0–39%]). Teachers in this study believed that the differing band widths were disadvantaging students and called for these to change. In the time since this data was collected, the Minister for Education has changed these bands and in doing so responded to the suggested changes reported here. The new grading bands for Junior Cycle are now Distinction [85–100%]; Higher Merit [70–84%]; Merit [55–69%]; Achieved [40–55%]; Partially Achieved [20–39%] and Not Achieved [0–19%]. Finally, teachers proposed two changes to the written curriculum. First, they called for changes to the content outlined in the written specification. These suggested

changes generally fit into three sub-themes, namely: add content (particularly in the area of Algebra and Geometry), reduce the volume of content in the specification, and increase the level of complexity of the content described in the current specification. The second suggested change to the written curriculum was in relation to the re-introduction of foundation level. Teachers felt that the specification needs to be designed at three levels, as was the case in the previous curriculum, so that students who struggle with ordinary level mathematics are accommodated. Teachers believe that this change would ensure that the Junior Cycle curriculum catered for a wider range of abilities and presented a meaningful and realistic challenge for all students at each of the three levels.

Discussion and implications

The first research question guiding this study sought to ascertain teachers' perspectives on the need for a revised Junior Cycle mathematics curriculum and to determine if they were supportive of the reform effort that was introduced for the subject of mathematics in 2018. The findings suggest that the majority of teachers did not see a need for a revised curriculum in mathematics, with 55.1% of teachers surveyed disagreeing or strongly disagreeing with the statement. Davis (2003) argues that in order for teachers to embrace reform they must become dissatisfied with the curriculum in place and see the need for reform, but this does not seem to have been the case in this instance. As a result, it is then unsurprising to see that the majority of teachers (53.1%) were also not supportive of the revised mathematics curriculum introduced at Junior Cycle. This lack of support from mathematics teachers is concerning, as researchers such as Fullan (2001) and Elmore (1995) state that curriculum reform is likely to fail unless fully supported and endorsed by teachers. The level of disagreement with the need for a reformed curriculum and lack of support for the revised curriculum recorded in this study seems to be an issue particularly pronounced for the subject of mathematics. In a study conducted with 1375 Junior Cycle teachers (12% of whom were teachers of mathematics), McGarr et al. (2023) also sought to ascertain teachers' perceptions of the need for a full-scale reform of the Junior Certificate. Their results revealed that when the responses of teachers of all subjects were considered there appeared to be more support for a revised curriculum at Junior Cycle. Only 9% of their sample reported that there was not a need for curriculum reform while a further 21% believed that curriculum reform was needed only to a minor extent. However, they did note in a subsequent report that the lowest level of support for the reformed Junior Cycle Framework was reported by teachers of mathematics and Gaeilge (McGarr et al. 2024). One potential reason for this lack of support for the reform effort from teachers of mathematics may be a result of what Dikes, Cunningham, and Gray (2014, 45) coined as 'change fatigue'. They assert that change or reform fatigue is often felt by teachers as a result of '*overwhelming and continual change in education policy in very short implementation periods*'. In Ireland, a revised mathematics curriculum, known locally as Project Mathematics, was introduced at both Junior and Senior Cycle on a phased basis from 2010. The phased implementation meant that 2018 was the first year in which all students doing their Leaving Certificate would have studied all strands of the 'new' curriculum since the beginning of their time in secondary education (Shiel and Kelleher 2017). However, it was in 2018 that the Junior Certificate mathematics curriculum was reformed again and the Junior Cycle mathematics

specification introduced. Two significant reform efforts in a relatively short period of time, can, according to Orlando (2014) and Dikes, Cunningham, and Gray (2014) lead to resistance and/or scepticism towards reform among teachers. This idea of 'reform fatigue' may also explain why expert teachers were less likely to believe that reform was needed for Junior Cycle mathematics than novice teachers. This would be the second significant reform that the majority of expert teachers would have experienced, whereas those deemed novice teachers in this study would have entered the teaching profession when Project Maths was firmly embedded in school systems and many would not have experience of teaching mathematics prior to the JCMS being introduced.

The second research question underpinning this study enabled the authors to further explore particular aspects of the revised curriculum that teachers felt were beneficial and those areas which they identified as weaknesses. A large proportion of teachers (47.2%) who responded to the survey item concerning the strengths of the revised mathematics curriculum reported that they could not identify a single strength. This highlights a misalignment between teachers' beliefs regarding what constitutes the effective teaching and learning of mathematics and what is outlined in the intended curriculum. The consequences of this misalignment, according to Handal and Herrington (2003, 60), '… *can affect the degree of success of the innovation as well as the teachers' morale and willingness to implement further innovation'*. This highlights how responding teachers inability to see any benefits associated with the revised curriculum could have a knock-on effect on their openness to future reform efforts, including reform at Senior Cycle, which is currently being developed by policymakers in Ireland.

While this research showed teachers struggling to identify any benefits with the revised curriculum, they were very forthcoming in their identification of pitfalls and changes they would like to see made to the curriculum. In particular, a large proportion of teachers (45.4%) felt the assessed curriculum, which is a core dimension of Glathorn et al.'s (2019) intended curriculum, was a significant weakness and in need of urgent attention. They outlined their belief that both the CBAs and the summative examination were not fit for purpose. Concerns around the CBAs were also reported in other studies conducted with mathematics teachers (Neururer and Ní Shuilleabhain 2022; Prendergast and O'Meara 2026), but more positive dispositions towards this key aspect of the reform were noted when a variety of subject teachers were surveyed (McGarr et al. 2023). Teachers in this study reported how they believed the CBAs and summative assessment practices were leading to a lack of student engagement, as well as higher achieving students not being challenged. This is concerning, particularly at a time when TIMSS and PISA results from 2000 to 2018 have shown lower-than-expected proportions of high achievers in the subject of mathematics at secondary level in Ireland (Pitsia et al. 2024). If the new curriculum is, as outlined by teachers in this study, failing to offer challenge and motivate high achievers, then this problem could be exacerbated in the years to come.

These findings in relation to teachers' beliefs regarding the tested curriculum were in contrast to the findings reported by McGarr et al. (2023), who found that seven in ten teachers believed that students valued the CBAs, at least to some extent, while approximately 40% of teachers felt that CBA1 was an effective learning experience for students. This figure stood at 34% for CBA2. This again highlights the prevalence of more negative attitudes towards this dimension of the curriculum among mathematics teachers when compared to teachers of other subjects. While the introduction of CBAs and the

reduced emphasis on the summative examination were introduced in the hope of a meaningful renewal of the Irish education system, Baş (2021) argues that when teachers' beliefs are at odds with the changes, as is the case reported here, then it may lead to increased resistance among teachers. This suggests that if teachers continue to view the changes to assessment at Junior Cycle as problematic, they may resist future attempts to introduce formative assessment if it is modelled off the Junior Cycle framework. Such findings need to be considered by policymakers as they consider any future reform to mathematics curricula in Ireland and worldwide.

While the tested curriculum was the area where the most issues were reported by teachers, other aspects of the curriculum (as outlined in the theoretical framework) were also identified as obstacles to successful reform. In particular the misalignment between the Junior and Senior Cycle curriculum and the lack of time available to implement the Junior Cycle curriculum were noted by teachers as areas of concern. Teachers in this study believed that the revised 'dumbed down' (T115) Junior Cycle curriculum was not adequately preparing students for Senior Cycle, particularly in the area of algebra. Gleeson (2024) asserts that this reduction in emphasis on the teaching of content knowledge in the revised curriculum is to facilitate an increased focus on the development of skills and learning outcomes. However, teachers in this study suggest that the lack of emphasis on critical mathematics content such as algebra is detrimental to students' progression, and as such, it is highly likely that issues reported by Authors (2018) in relation to Senior Cycle students' poor algebra skills will persist into the future. This will have serious consequences for the Irish governments' ambitions to be internationally recognised as '*providing the highest quality STEM education experience for learners*' (Government of Ireland 2017). It is therefore unsurprising that many teachers ($n = 35$) have called for additional emphasis on algebra at Junior Cycle. In relation to the issue of a lack of teaching time, researchers such as Keiser and Lambdin (1996) report that revised curricula that promote innovative teaching approaches require extensive class time in order for their goals to be realised. The reformed Junior Cycle curriculum is innovative and teachers in this study reported that CBAs and the recommended teaching approaches of the revised specification require more contact time than that which was needed to deliver the previous curriculum. However, they also outline how the time available to them has been reduced since the new Junior Cycle Framework was introduced. A study conducted with Irish teachers by Authors (2017) found that 62% of Junior Cycle teachers reported being dissatisfied with the time available to teach mathematics and the findings of this study suggest that following the implementation of the revised curriculum this remains a pressing issue. Research by Keiser and Lamdin (1996) and Zunica (2023) found that limited instructional time can hinder teachers' ability to implement reform-oriented teaching methods and as such, this issue of time identified by teachers in this study could mean that many of the lofty goals of the revised Junior Cycle specification are not realised as a result of misalignment between the written and supported curriculum.

In summary, when addressing the second and third research questions, we conclude that teachers are struggling to see the benefits or core values of the revised Junior Cycle mathematics curriculum and believe further change is needed. They perceive there to be many obstacles and challenges facing them as they navigate this new educational landscape and the weaknesses in the curriculum mean that they are highly likely to resist

changing their practices as espoused by policy makers. It is clear that the introduction of the revised curriculum has led to some internal turmoil for teachers and as outlined by Hughes and Lewis (2020: 290) '*where teachers perceive themselves to be in a situation of turmoil around curriculum reform, the extent to which they are able and willing to change their practices and responses can differ quite widely*'.

Conclusion

This study set out to determine teachers' perspectives on the reformed Junior Cycle mathematics curriculum, and in this paper, we discuss their beliefs around the need for a reformed curriculum, the suitability of the reformed curriculum, and the perceived strengths and weaknesses of the reformed curriculum. It must be noted at this point that the self-reporting nature of the study and the relatively low response rate from teachers are limitations of the research and the findings need to be considered in light of these.

Despite such limitations, this study offers a comprehensive insight into mathematics teachers' perspectives on the reformed Junior Cycle curriculum in Ireland. As outlined in the literature review, garnering such perspectives is critical when evaluating the current reform at Junior Cycle and when considering future reforms, such as those that are currently being considered at Senior Cycle. The findings reported here clearly indicate a disconnect between the intentions of curriculum designers and the experiences of teachers implementing the reform. A significant proportion of teachers in this study questioned the need for reform, and over half expressed a lack of support for the reformed curriculum. This was particularly true for more experienced teachers. Teachers' concerns centred primarily on assessment practices, curriculum content, and the preparation of students for Senior Cycle mathematics. While some positive aspects were acknowledged, particularly in relation to the written curriculum, many teachers were unable to identify any strengths, underscoring a pervasive sense of dissatisfaction and a perceived misalignment between the written curriculum and other aspects of the intended curriculum. This has, according to Gleeson (2024), been an issue facing educators and policymakers over the course of many different reform movements.

The misalignment between teachers' beliefs and the reform's core values reported in this paper is concerning, as research from Handal (2003) and Handal and Herrington (2003) has shown that such beliefs significantly influence the fidelity of curriculum enactment. Without stronger alignment between policy and classroom realities, the full potential of curriculum reform is unlikely to be realised. For future reforms to succeed, particularly those currently underway at Senior Cycle, teacher engagement, sufficient professional support and meaningful consideration of classroom realities must be prioritised. Ultimately, reform efforts must not only be well-designed but also earn the trust and support of those tasked with implementing them, and this paper provides an insight into how such support could be attained for future reform efforts.

Notes

1. The eight principles of Junior Cycle education are: Learning to learn, choice and flexibility, quality, creativity and innovation, engagement and participation, continuity and development, inclusive education and wellbeing.

2. The eight key skills of Junior Cycle are: Communicating, Staying Well, Managing Information and Thinking, Managing Myself, Working with Others, Being Creative, Being Literate and Being Numerate.
3. There are currently 3250 members of the IMTA
4. In Ireland, schools who have a high concentration of disadvantage are designated as DEIS [Delivering Equality of Opportunity in Schools] (DES, 2017). In 2025/26 32.4% of secondary schools in Ireland were designated DEIS.
5. Berliner (2004) contends that teachers can be classified as 'novice' or 'expert' teachers depending on experience. The time to develop expertise has been estimated at between 5 and 7 years. So for this study any teacher with 7 or less years' experience was considered novice and all others considered expert.
6. For ease of reading, for this comparative analysis those who agreed or strongly agreed were grouped into the 'Agree' category while those who disagreed or strongly disagreed were grouped in the 'Disagree' category.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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