

The Supply of Secondary Mathematics Teachers in Ireland: Insights from the Consecutive Initial Teacher Education Route

Mark Prendergast
University College Cork

Aoibhinn Ní Shúilleabháin
Dublin City University

Thomas Delahunty
Maynooth University

Máire Ní Ríordáin
University College Cork

Aoife O'Brien
*Atlantic Technological
University*

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Mathematics has long been heralded as a cornerstone subject within secondary school curricula worldwide. However, despite its recognised importance, there has been a pronounced issue with the global supply of teachers in the subject, which has received much attention over the past 15 years. Considering the well-established link between effective teaching and student learning, the lack of a strong supply of highly qualified mathematics teachers has serious implications for students' educational experiences and outcomes. In Ireland, both government policies and academic literature have sought to address and highlight the issue of teacher supply. Despite such attention, there appears to be a crisis-level shortage of newly qualified mathematics teachers graduating from consecutive (i.e., postgraduate) initial teacher education programmes. The aim of this paper is to take a closer look at the numbers of mathematics teachers graduating from this route through a detailed analysis of data from two Irish universities. The paper also examines some of the underlying reasons for mathematics teacher shortages and explores the motivations of mathematics graduates who choose to pursue secondary teaching through the consecutive route.

Keywords • teacher supply • mathematics secondary • consecutive route • teacher shortages

Introduction

Teacher shortages are significantly impacting education provision across the world (Marín Blanco et al., 2023; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023). It is estimated that 44 million additional teachers will be required to achieve universal primary and secondary education (Sustainable Development Goal 4) by 2030 (UNESCO, 2023). Across Europe and in Anglophone countries such as Australia, Canada, and the United States, the teacher supply crisis has led to unfilled teaching positions, which impacts class sizes and the offering of subjects in schools, particularly in lower socio-economic areas (Blackmore et al., 2023; Marín Blanco et al., 2023; Mills et al., 2025). Teacher shortages have also resulted in unqualified and out-of-field teachers teaching outside of their area of specialism, an issue which is particularly prevalent in mathematics and science (Hobbs & Törner, 2019; Whiteford et al., 2021). The situation in Ireland is no different and has been consistently highlighted in the national media. For example, a July, 2025, article in *The Irish Times* was headlined, "More than 1,800 teaching posts vacant amid 'supply crisis' for new school year" (O'Brien, 2025). At the secondary level, the issue appears particularly problematic in certain subjects, with mathematics consistently identified as one of the most affected (e.g., Teachers Union of Ireland [TUI], 2026).

Traditionally, there have been two main pathways into the teaching profession within Ireland's compulsory education sector (i.e., primary and secondary levels): (1) the concurrent route, undertaken as part of an undergraduate degree, and (2) the consecutive route, which involves completing a postgraduate qualification after earning a degree in a specific subject area. The concurrent route typically consists of a four-year Level 8 degree that integrates subject-specific content with education



and pedagogy. In contrast, the consecutive route (Level 9) delivers pedagogical training following the completion of an academic degree in a discipline aligned with school curriculum subjects. In 2014, the duration of consecutive initial teacher education (ITE) in Ireland was extended from one year to two years, resulting in a master's-level qualification known locally as a Professional Master of Education (PME). Even though this reconceptualisation offered several significant benefits, national graduate numbers from this route have declined by more than a third since the introduction of the extended programme (Sahlberg, 2019). This decline has affected all curricular areas, but mathematics has been particularly impacted. In recent years, the authors have encountered growing anecdotal evidence pointing to crisis-level graduation rates for mathematics teachers from PME programmes nationwide. This paper presents the first examination of this issue in the Irish context. Recognising that there are no simple solutions to the issue of teacher shortages (Whiteford et al., 2021), it examined the national challenge of declining mathematics teacher supply through an analysis of graduation trends from the consecutive route across two Irish universities. In addition, the study explored potential underlying causes of the shortage and investigated the motivations of mathematics graduates who pursue secondary mathematics teaching through the consecutive route.

Teacher Supply in Focus: What Deters, Attracts, and Motivates?

Reasons for the shortages in teacher supply across the globe are numerous, but there are consistent themes across countries. Financial barriers can stymie candidates' decisions to enrol onto initial teacher education (ITE) programmes, particularly for postgraduate or mid-career candidates who must pause their earning in order to qualify to teach (Mills et al., 2025; White et al., 2024). Research has also demonstrated that issues around pay, career progression, the status of teaching, and opportunities for meaningful professional development and collaboration impact teacher recruitment and retention (Blackmore et al., 2023; Darling-Hammond, 2017; UNESCO, 2023).

Internationally, some issues with teacher supply have been successfully addressed through targeted recruitment strategies, in which candidates' preparation fees and training salaries are covered through a competitive application process (e.g., Jiang & Yip, 2024). In certain cases, conditions such as a commitment to teach for three to five years post-qualification have been attached to the financial support to mitigate attrition (Darling-Hammond, 2017). Such funding strategies have resulted in raising the profile of teaching and in over-subscription to programmes, with the diversity of candidates improving due to the funded nature of their ITE (Darling-Hammond, 2017). Countries that have successfully tackled teacher recruitment have also invested in creating conditions where teaching is professionally supported, with multiple career progression and pathway opportunities beyond the school principal route (Blackmore et al., 2023; Darling-Hammond, 2017). UNESCO's (2023) most recent report on addressing teacher shortages emphasised these types of structural reforms, where the status of teachers can be raised by emphasising their autonomy and professionalism. This is particularly relevant for recent school leavers, who can be encouraged to view teaching as a worthy and worthwhile career to pursue (de la Cruz & Goldman, 2023; Ní Shúilleabháin & Cronin, 2017; UNESCO, 2023).

Alongside the crises of teacher shortages, there has been an increased interest in exploring the motivations of those choosing teaching as a career (Watt & Richardson, 2007; Whiteford et al., 2021). Motivations which influence a person's choice in becoming a teacher are often categorised as intrinsic, extrinsic, or altruistic (Callahan & Brantlinger, 2023; Fuchs et al., 2022). Intrinsic motivations stem from internal drivers such as personal interest in the subject matter, enjoyment of teaching, and a sense of fulfilment through the activity of teaching (Klassen et al., 2011). Extrinsic motivations are influenced by external factors, including financial incentives and the social status of teaching (Fuchs et al., 2022). Altruistic motivations relate to a person's drive to contribute to society or work with children (Nesje et al., 2018). Research has demonstrated that intrinsic and altruistic motivations, which reflect a desire to help others and contribute positively to their lives, are highly influential in attracting people into a career in teaching (e.g., Kyriacou & Coulthard, 2018).

In the context of this research, it is important to focus specifically on the motivations of those choosing mathematics teaching as a career. While investigating motivations for becoming a science and



mathematics teacher in Australia, Whiteford et al. (2021) found that the strongest motivator was an altruistic belief that becoming a teacher would make a significant contribution to society. Second to this was a love of subject area, which was ranked equally alongside work-life balance. Other influencing factors included personal reward, past teachers, job security, school experience, and career structure. Van Rooij et al. (2020), in a survey of STEM undergraduates in the Netherlands, found that those interested in teaching ranked social factors (i.e., working with or helping people) as important elements of their future careers. Similarly, Demir et al. (2019), in their United States based study, found that altruistic motivations were important for candidates considering teaching. They noted that more strategic efforts were needed to recruit mathematics teachers at all levels, for example, by providing opportunities to experience the rewarding aspects of helping others learn. Research in the Irish context has also demonstrated that such experiences can encourage undergraduates to consider a career in teaching (Ní Shuilleabhain & Cronin, 2017).

Taken together, the literature highlights a clear interconnection between structural issues in teacher supply and the motivations of those entering the profession. Whereas systemic factors such as pay, career progression, and professional status shape the feasibility and attractiveness of teaching, individual motivations, particularly intrinsic and altruistic drivers, also play a critical role in determining who chooses to enter the profession. Understanding how these factors interact is essential to addressing teacher shortages, as recruitment strategies must both remove structural barriers and appeal to the values and aspirations of prospective teachers. In the Irish context, these dynamics are further shaped by how ITE is provided, which is explored in the following section.

The Provision of Initial Teacher Education in Ireland

Set against a background of significant structural and policy changes for education in the last two decades, the structure of ITE in Ireland has evolved considerably. In 2006, the Teaching Council was established as the national body of professional standards for teaching in Ireland. It holds responsibility for the professional accreditation of programmes of teacher education, as well as registration and professional education of teachers. Following this, the accreditation requirements for reconceptualised ITE programmes specifying a number of mandatory elements of study, as well as structural requirements were published in 2011 (The Teaching Council, 2011). Coinciding with this publication, a review of the structure of ITE in Ireland (Sahlberg et al., 2012) was commissioned by the Minister for Education and Skills with the intention of identifying a new structure for ITE in Ireland. This report recommended introducing a master's-level qualification to replace the Higher Diploma in Education (HDE) for consecutive ITE models, for both primary and secondary level ITE routes. As a result, and as previously noted, since 2014 all Teaching Council accredited consecutive programmes of ITE are of two years' duration. Although extending ITE has enhanced the depth and duration of student engagement, it has also left a lasting legacy for current provision (Ní Ríordáin et al., 2025). The financial and temporal costs of the two-year PME programme have made the profession less accessible to graduates (Prendergast et al., 2021). These costs also coincided with 2010 Government austerity measures that removed certain allowances for additional qualifications and limited promotional opportunities (Harford & Fleming, 2023), which may have discouraged potential teachers and prompted some to seek opportunities abroad, further exacerbating challenges in teacher attraction and retention.

With specific reference to mathematics, it is identified consistently as one of the subjects most affected by teacher supply issues (e.g., TUI, 2026). This is not a new concern. Research by Ní Ríordáin and Hannigan (2011) found that 48% of secondary mathematics teachers were working out-of-field, meaning they did not meet the Teaching Council's subject requirements for registration. In response, the Department of Education and Skills funded a national professional development programme, delivered by a consortium of higher education institutions, to upskill out-of-field mathematics teachers. Known as the Professional Diploma in Mathematics for Teaching (PDMT), the programme has reduced out-of-field teaching to 25% (Goos et al., 2023), yet a significant number of students continue to be taught by underqualified teachers in a core subject. This is particularly concerning given evidence that students learn more effectively from teachers who are skilled, experienced, and knowledgeable about



both content and pedagogy (e.g., Goldhaber & Brewer, 2000; Krauss et al., 2008). Out-of-field teachers are often assigned to younger class groups, those perceived as lower-ability, or students in non-examination years (Ní Ríordáin & Hannigan, 2011), creating inequities in access to qualified instruction. Such disparities may also undermine efforts to attract future candidates into mathematics teaching.

Theoretical Perspective: Data Gaps, Teacher Shortages, and Entry Motivations

Prior to formulating research questions and a research design, the authors sought to ground the study in relevant theoretical perspectives that would help to explore the phenomenon of teacher supply in the subject of mathematics. As outlined in the introduction, the first focus of this study was to take a closer look at the numbers of mathematics teachers graduating from consecutive ITE routes. Harford and Fleming (2023) critiqued the Irish state’s failure to adequately address the escalating shortage of qualified teachers, particularly considering growing demand and increased system complexity. Their review was set within an international context, noting parallels globally, and arguing that inadequate data and poor policy responses have worsened the situation in Ireland. At the heart of their critique is the absence of reliable, up-to-date data to underpin effective planning. Despite nearly a decade of school principals reporting widening shortages, they argued that a vacuum in evidence-based policy planning has severely constrained the state’s ability to respond systematically to subject-specific and regional shortages (Harford & Fleming, 2023). Although there is consensus that data are the "nucleus" of any meaningful response (Harford & Fleming, 2023), successive governments have appeared more inclined to adopt short-term fixes over structural reform, and a lack of data continues to be an issue (Conway et al., 2025).

As well as taking a close look at secondary data, this study also aimed to explore both the reasons behind teacher shortages in mathematics and the motivations of mathematics graduates pursuing secondary teaching through the consecutive route. To conceptualise the reasons for teacher shortages, several theoretical stances were considered. As highlighted, teacher shortages represent a complex challenge influenced by a range of national and international interconnected factors, such as evolving working conditions, the low status of the profession, and the quality of ITE (Blackmore et al., 2023; Darling-Hammond, 2017; UNESCO, 2023). Given the complexity of the issue, Marín Blanco et al. (2023) argued that an analysis of structural (teacher education, societal reforms), social (media scrutiny, questioned legitimacy), and cognitive (work and job satisfaction) dimensions is needed to understand the current situation involving teacher shortages. They proposed a methodological model for empirical research, which includes three categories for describing and analysing teacher shortages, namely, educational policy, the attractiveness of the teaching profession, and the changing landscape of teaching (see Figure 1). Each of these categories have several corresponding considerations. For example, work conditions is a parameter of the attractiveness of the teaching profession and has a number of indicators such as salary, workload, flexibility, classroom climate, and resources.

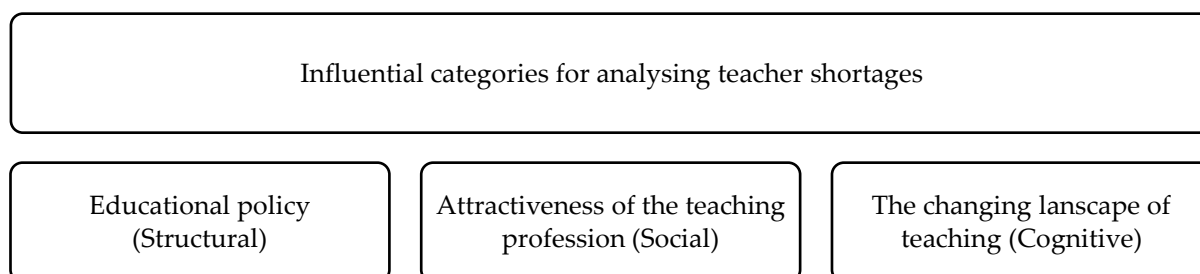


Figure 1. A model for empirical research on teacher shortages (Marín Blanco et al., 2023).

Regarding motivations, as previously noted, much of the literature refers to intrinsic, altruistic, and extrinsic motivations for undertaking a teaching career (Callahan & Brantlinger, 2023; Fuchs et al., 2022). Watt and Richardson (2007), however, argued that these categories are too broad and potentially overlap. To address their concerns, they developed the Factors Influencing Teaching Choice (FIT-Choice) model (see Figure 2), which posits that teachers' reasons for entry generally fall into one of five categories: (1) socialisation influences, (2) task perceptions, (3) self-perceptions, (4) values, and (5) fallback career options. Building on previous work, Watt and Richardson (2007) focused on three specific values in their model: intrinsic, personal utility (extrinsic), and social utility (altruistic). They also incorporated other factors identified in the existing literature regarding influencing the decision to teach (e.g., perceived teaching abilities, and prior teaching and learning experiences).

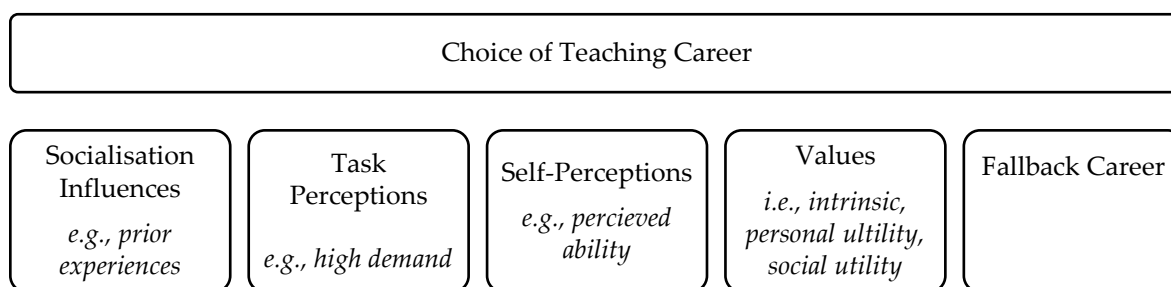


Figure 2. Factors Influencing Teaching Choice (FIT-Choice) Model (Watt & Richardson, 2007).

The authors adopted both the Marín Blanco et al. (2023) and the Watt and Richardson (2007) models to conceptualise the study, and to frame the findings within existing theories related to teacher shortages and motivation for choosing a teaching career.

The Study

As outlined, the aim of the study was twofold. First, given the lack of available data, an effort was made to gain insight into how the number of secondary mathematics teacher graduates from the consecutive ITE route had changed in recent years. This constitutes Phase 1 of the study, which involved an analysis of secondary quantitative data on the number of consecutive route ITE mathematics graduates from two universities. In Phase 2 of the study, both the reasons behind teacher shortages in mathematics and the motivations of mathematics graduates pursuing secondary teaching through the consecutive route were explored. This phase involved interviews with a number of consecutive route mathematics graduates. The study focused on addressing the following research questions:

1. *How has the number of secondary mathematics teacher graduates from the consecutive ITE route changed since 2010?* (Phase 1)
2. *What do secondary mathematics teachers who have graduated from the consecutive route perceive as the main reasons for teacher shortages in the subject?* (Phase 2)
3. *What do secondary mathematics teachers who have graduated from the consecutive route perceive as the main motivations for entering teaching through this pathway?* (Phase 2)

In order to address the research questions, an explanatory, sequential, mixed methods research approach was adopted (Bowen et al., 2017). With regard to Research Question 1, data were collected from two of the six Irish universities offering a consecutive ITE route at the secondary level, focusing on the number of graduates who had qualified to teach mathematics since 2010. The year 2010 was chosen as it predates the 2014 reconceptualisation of the consecutive ITE route by several years. To allow for comparison with another core secondary school subject, we also decided to gather data regarding the

number of English graduates in the same time period. The two universities were selected using a convenience sampling strategy based on accessibility (Cohen et al., 2018), with at least one of the authors having worked on the PME programme at each institution.

To address Research Questions 2 and 3, semi-structured interviews (Galletta & Cross, 2013) were conducted with eight mathematics teachers who had graduated from each of the two universities since the reconceptualisation of the consecutive route in 2014. For this empirical phase of the study, participants were recruited using a purposive sampling strategy to access 'knowledgeable individuals' (Cohen et al., 2018, p. 219). In this context, 'knowledgeable individuals' were mathematics graduates who could offer insight into the reasons for teacher shortages in the subject, as well as motivations for entering teaching through the consecutive pathway. Drawing on Phase 1 of the study, the authors identified a total of 144 mathematics graduates from the consecutive route across both universities between 2016 and 2024. Guided by the concept of "information power" (Malterud et al., 2015), invitation emails were sent to 14 graduates (seven from each university) who were known to be teaching secondary mathematics, represented a range of undergraduate mathematics backgrounds, and had diverse second teaching subjects. Of these, four graduates from each university agreed to participate in Phase 2. Table 1 (using pseudonyms) summarises the characteristics of the sample.

Table 1
Sample Characteristics

	Name	Gender	Graduated PME	Year of PME Graduation	Qualification prior to PME	Teaching Subject(s)
1	Sean	Male	University A	2024	Arts – Joint Honours	Mathematics and Gaeilge
2	Barry	Male	University A	2024	Arts – Joint Honours	Mathematics and English
3	Paul	Male	University A	2024	Mathematical Sciences	Mathematics and Physics
4	John	Male	University A	2022	Arts – Joint Honours	Mathematics and Economics
5	Edel	Female	University B	2017	Arts – Joint Honours	Mathematics and History
6	Mary	Female	University B	2017	Arts – Joint Honours	Mathematics and Gaeilge
7	Julie	Female	University B	2016	Arts – Joint Honours	Mathematics and French
8	Cathal	Male	University B	2017	Mechanical Engineering and HDip in Mathematics	Mathematics

Following ethical approval from the University College Cork Social Research Ethics Committee, semi-structured, one-to-one interviews were conducted by the lead author between January and March 2025. At the beginning of the interviews, the author explained the purpose of the study and the interview structure, emphasising that there were no correct or incorrect answers. Although the interview schedule comprised 12 questions addressing a broad range of teacher supply issues, this paper focuses on responses to six questions exploring the reasons for teacher shortages and the main motivations for entering the teaching profession through the consecutive route. The remaining questions, which are beyond the scope of this paper, examined the impact of mathematics teacher shortages in Irish secondary schools. All of the questions were prepared in advance (see Appendix A), but the semi-structured nature enabled the direction of the interviews to be tailored to each participants' responses. All eight interviews took place online via Microsoft Teams, which offered the benefit of allowing participants to engage in a comfortable and convenient setting. After providing informed consent, each semi-structured interview lasted approximately 30 minutes. The recordings were transcribed word-for-



word using online transcription software and then cleaned and edited by the authors. Any identifying details were subsequently removed to ensure the participants' anonymity. Each participant was assigned a pseudonym to be used for reporting purposes.

Braun and Clarke's (2022) thematic analysis framework was used to analyse the transcribed data. An inductive "bottom up" orientation guided the analysis and was used to identify themes generated through the views of the mathematics teachers' in this study. Implementing Braun and Clarke's (2022) six phases in the process of thematic analysis provided a framework for data engagement, coding and theme development. Identifying the initial codes was done with a mindset described as "open mind versus empty head" (Giles et al., 2013), acknowledging existing theoretical models on reasons for teacher shortages and motivations for entering the teaching profession (e.g., Marín Blanco et al., 2023; Watt & Richardson, 2007). The assumption was not made that the initial codes should align with established theories. This approach facilitated being receptive to new insights and understandings derived directly from the data, rather than being constrained by pre-existing theories or assumptions that might not fully apply to the Irish context. The process was flexible and iterative, involving continuous revisitation and refinement of initial codes. For example, codes such as "fast career progression," "variety of industries" and "dynamic roles" were categorised into the theme "Diverse career opportunities." The coding process was thorough and comprehensive, and all themes were checked against each other and back to the original data set. Whereas the coding and generation of initial themes was completed by the first author, two other authors came together to review and develop the themes. In some cases, this led to the merging of two themes into one, along with the creation of sub-themes. For example, "Gap in salary" and "Two-year PME route" were combined under the overarching theme of "Financial considerations," with specific sub-themes labelled "Salary opportunities" and "PME length and cost." The final part of the process was refining and finalising each theme so that there were no overlaps and ensuring each theme was internally coherent and accurately represented the data. At this stage, after discussions amongst two of the authors, the names of some themes were adjusted. For instance, the theme "Influence of teachers and mentors" was adjusted to "Past influences" to encapsulate a broader range of individuals and experiences that played a pivotal role in guiding the participants toward the teaching profession.

Findings

Research Question 1: How has the number of secondary mathematics teacher graduates from the consecutive ITE route changed since 2010?

The quantitative data gathered tracked the number of consecutive route graduates in mathematics and English from two universities since 2010. As noted, this route moved from a one-year to a two-year qualification in 2014. Hence, there were no graduates in 2015. As can be seen from Figure 3 and Figure 4, there has been a decline in the number of graduates across both subjects since the introduction of the two-year programme. It is, however, important to consider the context surrounding this decline. For example, the consecutive ITE routes across Universities A and B were admitting an average combined total of 422 students per year into the one-year HDE programmes. When the programme was reconceptualised as a two-year PME in 2014, the intake across both universities was nearly halved to an average combined total of 222 students per year due to staffing constraints and limited availability of school placement opportunities. As a result, a decline in graduate numbers from 2016 was expected. This contextual factor, however, does not explain the pronounced decline in mathematics graduates. For instance, in the five years prior to the reconceptualisation (2010–2014) there was an average of 91 mathematics teachers graduating from an average annual cohort of 422 students across both universities, representing 22% of the total graduate cohort. Since the introduction of the PME this figure has fallen to an average of 15 mathematics teachers graduating per year from an average annual cohort of 222 students, representing just 7% of the total cohort. Overall, this reflects a 68% relative decrease in the proportion of secondary mathematics teachers graduating between the periods 2010–2014 and



2016–2025. As a comparison, in English, between 2010–2014, there was an average of 147 English teacher graduates per year from an average combined total of 422 students across both universities. This represented 35% of total graduates. Following the introduction of the PME this number changed to an average of 81 English teacher graduates per year from a cohort averaging 222 students, representing 36%. Thus, when considered proportionally, this reflects a slight increase in the proportion of English teachers graduating through the two-year PME route (2016–2025) compared to the HDE route (2010–2014).

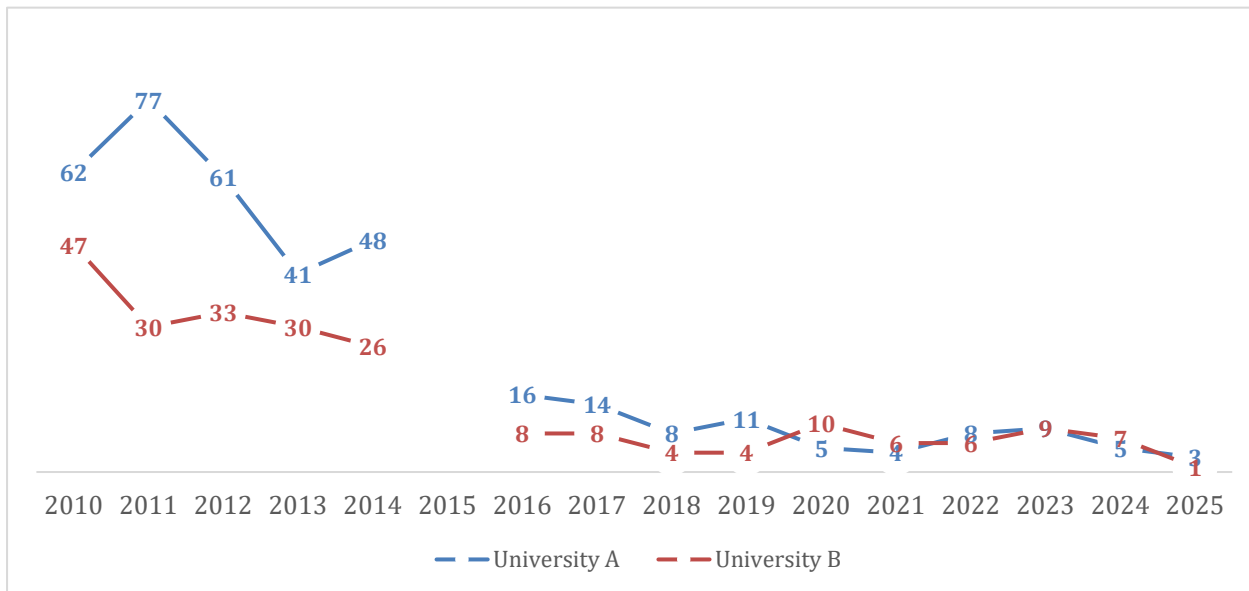


Figure 3. Number of mathematics graduates from the consecutive route.

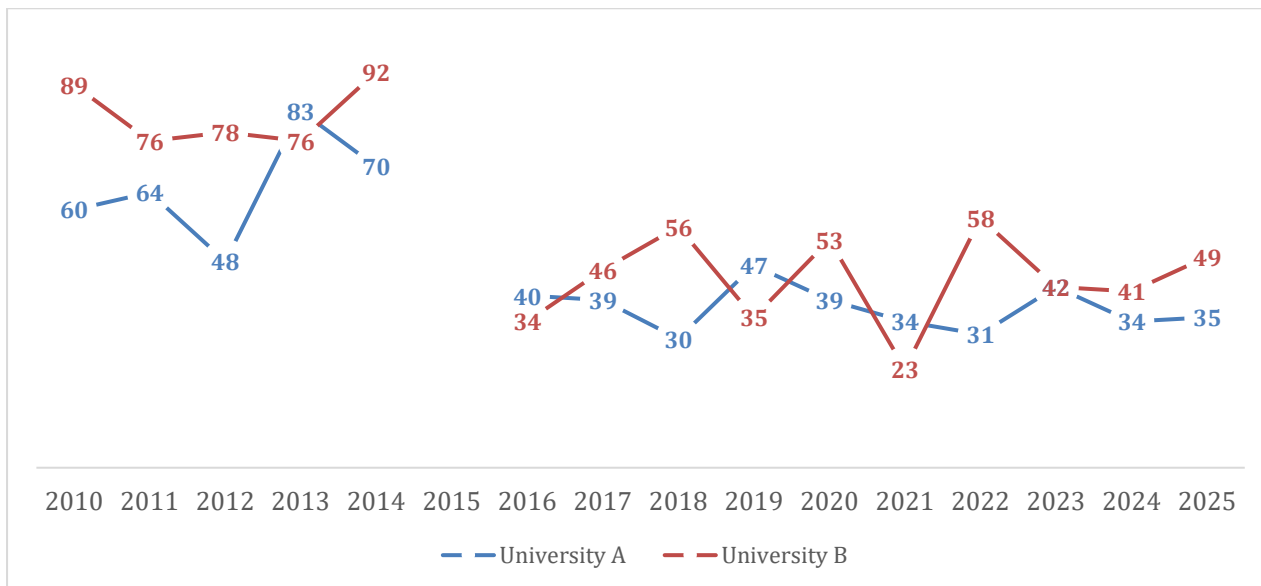


Figure 4. Number of English graduates from the consecutive route.



Research Question 2: *What do secondary mathematics teachers who have graduated from the consecutive route perceive as the main reasons for teacher shortages in the subject?*

In terms of the perceived reasons for teacher shortages, there were three core themes generated from the interview data with mathematics teachers. These were categorised according to the dimensions in Marin Blanco et al.'s (2023) model for empirical research on teacher shortages.

Financial considerations: Structural dimension

Financial considerations (both in terms of the salary disparity between teaching and other industries and the cost and length of the PME) were the main reasons identified for the lack of mathematics teacher graduates through the consecutive ITE route. Many participants cited the length and cost of the two-year PME route as a key barrier to entering the teaching profession, particularly after completing a three- or four-year undergraduate degree. The additional time and financial commitment involved in the PME was perceived as a significant deterrent, especially when compared to shorter postgraduate options in other industries (e.g., finance or data science). Several participants pointed out that after investing in an undergraduate degree, many graduates find it financially burdensome to continue with another two years of study.

John: The length of time and the cost of the PME is definitely a barrier of entry for some people. You know you have to kind of sacrifice those two years where you're paying a lot of money.

Others (Edel, Colm, Julie) emphasised that mathematics graduates are drawn to high-paying careers that offer better salaries, faster career advancement, and greater financial rewards.

Julie: Like anything, I'd say salary is an important factor. You know, a maths degree can leave you kind of open to a very broad range of follow-on subjects. I suppose, and with a little bit more study, you can get yourself on to some really, really strong career paths that can earn you an awful lot of money.

These factors overlap with another key theme, namely, "Diverse career opportunities."

Diverse career opportunities: Cognitive dimension

One of the most frequently mentioned reasons for mathematics graduates not considering the teaching profession was the "diverse career opportunities" available in other fields. Graduates with a mathematics background are in high demand in various sectors, such as finance, technology, data science, engineering, and actuarial science. Aligning with research from Nguyen and Springer (2021), these sectors present a much more attractive option compared to teaching, where salaries are perceived as lower, and long-term career growth is slower. Throughout the interviews, teachers shared that sectors such as finance were seen as more directly related to the skills developed during a mathematics undergraduate degree. As a result, many graduates choose these paths over teaching, which offers a relatively static salary and fewer immediate financial incentives.

Edel: You know that the career progression, for maths in particular like, you can go on and do financial maths, actuarial maths—like maths is such an in-demand subject that companies are paying a lot more than teachers are paid.

The sectors offer immediate job opportunities with attractive salaries and opportunities for career advancement, as outlined above. Edel, Sean, and Colm highlighted that many mathematics graduates find themselves drawn to roles that are more specialised, offering the chance to work with cutting-edge technology or in high-demand industries. The variety of career paths, especially those that allow for immediate financial rewards, makes teaching seem like a less attractive option.

Sean: I think you do so much in the maths undergraduate that your options are opened up to so many other avenues, for example, the wages straight out of college for an actuary can't compare to those of a newly qualified teacher. It opens that door and you think, okay I've put so much effort into that undergrad, the maths was so difficult, why would I not keep going and get the financial rewards.

Such findings relate to research from Fuchs et al. (2022), who outlined that particular attention should be paid to encouraging STEM graduates into teaching, especially at undergraduate level. Without



highlighting the pathway to undergraduates, they are unlikely to choose it when so many other options are marketed to them (Demir et al., 2019; Fuchs et al., 2022).

Negative perceptions of teaching: Social dimension

The data also highlighted that there are prevailing "negative perceptions" of teaching, especially mathematics teaching, in society. This discourages many highly skilled mathematics graduates from considering teaching as a serious career.

Edel: There also seems to be a stigma around teaching not being a good career, and not a well-paid job, and that it's just something you fall into. There's also a status thing. I suppose, many of those studying maths in college generally tend to be high achievers and have got good grades. Some of my friends would have said like, "I'm not wasting my 550 points on teaching" kind of thing. So yeah ... I don't think teaching has the status that it needs.

Although salary is mentioned by Edel, it is the negative aspect of social status that she emphasised. Similarly, Mary reflected on how mathematics graduates are often encouraged by guidance counsellors or peers to pursue careers outside teaching.

Mary: Students who are really strong at mathematics, I think they're being directed elsewhere by guidance counsellors and, you know, by whoever they're getting their advice from. If they show a really strong mathematical ability, there is a sort of attitude thing to, you know, "Well don't 'just' be a maths teacher ... You should be doing something 'more' with your ability." You know, something that can earn you more money or accolades or whatever it may be.

These perceptions contribute to a sense of teaching being an undervalued profession that is not attractive to talented graduates with high academic achievements (Nguyen & Springer, 2021). Media portrayals of teachers as overworked and underpaid also reinforce this stigma, making teaching less appealing to potential candidates who could otherwise pursue higher-paying and more prestigious jobs.

Julie: There's also the stigma, you know, the teachers in the media and all that sort of stuff. You are kind of finding now even It's a harder sell to people that teaching is a great idea.

This social element of the attractiveness of the teaching profession is rarely considered in educational policy, but is, as outlined by the teachers, a core part of the decision-making process of their peers who chose not to become mathematics teachers.

Research Question 3: What do secondary mathematics teachers who have graduated from the consecutive route perceive as the main motivations for entering teaching through this pathway?

To address the third research question, data from the eight semi-structured interviews were analysed to further understand the main motivations to enter the teaching profession through the consecutive ITE route. There were three themes generated from the data and each of these could be mapped onto two of the five categories of the FIT—Choice model, namely "socialisation influences" and "values," with the latter category focusing on both "social utility" and "intrinsic" values. These are discussed in order of frequency of occurrence within the data.

A passion for teaching: Social Utility Value

Many of the participants cited a deep "passion for teaching" as a key motivator in their decision to pursue the PME route and become a mathematics teacher. The desire to help others and make a difference in students' lives was a recurring response. Several participants expressed the fulfilment they found in teaching and helping others and the motivation they had to pursue that role.

Sean: I love the idea of teaching. I love helping people get through something or helping people to understand something I like. I love that challenge. I've always loved doing maths when I was in primary school, like helping someone next to me figure out how to do the question. I loved that idea, and I always said like if I get paid to do that, it's a perfect job.

Barry emphasised his motivation to work with students and young people:

Barry: From a personal point of view, I have always loved working with children and teenagers, whether in summer camps or going into schools coaching and stuff. And so, the motivation for me was to get to work with students in that sense and obviously to try and help them and teach them what I know.

Participants such as Paul also reflected on the satisfaction of working and interacting with others on a daily basis.

Paul: I suppose I'd be very extroverted, and I'd like dealing and working with people. And I think that's quite important and that definitely played a big role in deciding to become a teacher. You know, teaching in any form you're surrounded by people all day and you're having interactions with people, and I think it's really important as a teacher to be able to find some sort of fulfilment in that.

This joy of teaching, particularly in terms of working and helping young people, was a central reason many participants decided to pursue the profession. The data highlighted that a passion for teaching was not just about subject matter for these teachers, but also about the interaction with students and the joy of facilitating their learning. This aligns with the social utility values outlined by Watt and Richardson (2007). Demir et al. (2019) similarly observed a strong passion for teaching among prospective mathematics teachers and suggested that emphasising this could encourage more individuals to pursue teaching in alignment with their values.

A love for mathematics: Intrinsic value

A deep-rooted "love for mathematics" was also identified as a core theme motivating participants to pursue teaching. For many, the love of the subject was the starting point for their career decision, and teaching mathematics offered an opportunity to share this passion with students. Several participants, including Sean, described their love for the challenge of mathematics and "trying to figure out a hard problem," emphasising how this intellectual challenge sparked their interest in teaching mathematics to others. For Julie, the love of mathematics was combined with the joy of helping students understand.

Julie: I suppose I always loved maths. It was just always one of my favourite things. I loved that anything can be explained I think a lot of people who love maths love the understanding behind it and the figuring things out and there is a real joy in sharing with somebody else how to figure something out. You know, giving them the skills to do that.

Participants consistently described their genuine interest in mathematics and how this passion remained a driving force throughout their educational journey.

Colm: If you're passionate about maths, it's great ... introducing first years to the basics and seeing them develop through to the senior cycle is rewarding.

The data suggested that for many of the participants, mathematics is more than a subject; it is a lifelong interest that fuels their career choice. Teaching mathematics provides an avenue to stay deeply connected to the subject while also sharing that enthusiasm with the next generation. Such findings align with those of Fuchs et al. (2022), who identified a passion for the subject as a key element motivating those who become mathematics teachers.

Past influences: Socialisation influences

In terms of "past influences", the participants were swayed strongly by the encouragement and support they received from previous teachers, mentors, and career guidance counsellors. These past influences often played a pivotal role in guiding them toward mathematics and the teaching profession. Several participants were motivated by teachers who inspired them during their own education. For example, Mary described how a teacher in her final year of school encouraged her to pursue mathematics in college: "It was my maths teacher who worked really hard with us and convinced me to study it further." Similarly, John reflected how his mathematics teacher at school influenced him to become a teacher:

John: One of my maths teachers from secondary school lived in around the same area as me and when I was working in the local shop, he'd be in the whole time and asking about college and so on and he knew I was doing maths as one of my subjects in college. So, he kind of gave me a good bit of guidance in that and to be honest, he was actually a huge influence in me becoming a secondary school maths teacher.

The data also indicated that career counsellors played an important role in helping some participants realise that teaching could be a good fit for them. Sean shared, "My career guidance teacher suggested secondary school maths" reflecting how these past influences helped participants consider teaching as a viable career path. Besides teachers, some participants were also influenced by peers and mentors who helped them to recognise their potential for teaching. Paul mentioned that peers had told him, "You're a pure teacher," encouraging him to pursue teaching, especially after he began enjoying his role in teaching tutorials. Thus, socialisation influences appear to have been a powerful motivator for many participants, not only providing guidance but also reinforcing the personal qualities and perceived ability that made them well-suited to a career in education.

Discussion

Teacher shortages present a widespread challenge for individual students, schools, teachers, and societies worldwide, as the availability of qualified teachers is a cornerstone of any educational system (Damber & Boström, 2024). In Ireland, this issue is particularly pronounced in the subject of mathematics (TUI, 2026). This research set out to gain insight into how the number of secondary mathematics teacher graduates through the consecutive ITE route have changed in recent years, to examine the reasons for mathematics teacher shortages, and to identify the main motivators in becoming a mathematics teacher through the consecutive route.

Whilst the findings may be of interest to educators, researchers, and policymakers in the field of teacher education, particularly from an Irish perspective, they should be interpreted within the limitations of the research. First, our study employed a purposive and convenient sample with a small number of participants from two of the six universities in Ireland offering a consecutive ITE route at the secondary level. Thus, the perspectives found in this study may not represent the perspectives of the many secondary school mathematics teachers who have graduated through the consecutive route in Ireland. Second, to further understand the reasons behind teacher shortages, it would have been beneficial to gather the perspectives of university mathematics graduates who chose not to pursue a teaching career through the consecutive route after graduation. This is certainly an area that the authors have identified for future research. Third, although all interview participants entered the teaching profession within the last decade, the study relies on retrospective accounts of their reasons for choosing teaching. As Callahan and Brantlinger (2023) note, teachers' recollections of their career motivations may change over time, and their reported motivations may not fully align with their actual, internal motivations. Notwithstanding these limitations, the research outlined in this study is timely and topical and provides useful insights into teacher supply issues in the subject of mathematics.

The findings in relation to Research Question 1 provide up-to-date data on the number of consecutive route mathematics graduates from two Irish universities since 2010. Although graduate numbers from this route declined by more than a third following the introduction of the two-year programme (Sahlberg, 2019), several complexities must be considered to make sense of the situation. Firstly, it is important to note that many universities, such as the two included in this study, reduced their intake when transitioning to the two-year PME, due to staffing constraints and limited availability of school placement opportunities. As a result, a decline in annual graduate numbers, compared to the one-year HDE, was to be expected. However, a closer look at the data revealed some noteworthy findings. There was a 68% decrease in the proportion of secondary mathematics teachers graduating between the periods 2010–2014 and 2016–2025. In contrast, the proportion of English teachers graduating during the same time frame increased slightly. Thus, whilst it may be tempting to attribute the decline in consecutive-route graduates solely to the introduction of the two-year PME, this study suggests that, from a mathematics perspective, the issue is more complex and more pronounced.

Research Question 2 examined the main reasons for teacher shortages in mathematics from the perspective of teachers who entered the profession through the consecutive route. As outlined in the findings, three core themes were identified from the data. Each of these could be mapped onto Marín Blanco et al.'s (2023) model for empirical research on teacher shortages and all three categories of the model (Structural, Cognitive, and Social) were reflected. However, the structural dimension, specifically



the financial considerations, was the most pervasive. In line with UNESCO's (2023) report on addressing teacher shortages, our research highlights that financial considerations, specifically the salary gap between teaching and other industries, as well as the cost and duration of the PME, are among the primary deterrents for undergraduate mathematics students considering the consecutive ITE route. This is especially true when potential entrants contemplate the diverse career opportunities available in other sectors, particularly for those with a mathematics background. As a way to boost numbers entering ITE in mathematics, it may be relevant to look to countries that have successfully tackled teacher recruitment through competitive scholarship programmes for participation in ITE, where tuition, salary and a commitment to teaching for a minimum number of years are incorporated (Darling-Hammond, 2017). Another common theme in terms of reasons for teacher shortages was "negative perceptions of teaching." This is a noteworthy finding, particularly in the Irish context, as traditionally the teaching profession in Ireland has benefitted from high public status (O'Doherty & Harford, 2018).

One of the key challenges in education policy is identifying how to recruit high-quality teachers (Giersch, 2021). With this in mind, Research Question 3 explored the motivations for individuals to enter the mathematics teaching profession through the consecutive pathway. There were three themes generated from the data and, once again, each of these aligned with elements of Watt and Richardson's FIT-Choice model (2007). In line with previous research, the importance of altruistic and intrinsic factors in influencing the decision to pursue teaching as a career was confirmed. The most frequently cited theme was a "passion for teaching," often expressed as a desire to help others and make a meaningful difference in students' lives. This reflects social utility value or an altruistic motivation, which Callahan and Brantlinger (2023) described as a selfless commitment to supporting others and contributing positively to their lives. The second most frequently cited motivation was a "love for mathematics," which can be classified as an intrinsic value. This is in keeping with Valentine's (1934) seminal work that highlighted the desire to remain connected to a favoured subject as a powerful influence in the decision to enter teaching. Furthermore, in both Clarke's (2009) and Heinz's (2013) Irish studies on secondary level student teachers' career motivations, the intrinsic factor "love of subject" was a key influence. In our findings, this intrinsic motivation was often interlinked with the joy of helping students understand (altruistic). The data from the interviews highlighted the immense passion teachers bring with them for their subject and their responses highlighted their drive to pursue teaching as a way to share their interest in their subject with others. The third theme generated from the data in terms of motivation was "past influences." This is very much in line with the research of Watt and Richardson (2007) who determined that new teachers' social influences and prior experiences factor in their decisions to enter the profession.

Conclusion

To conclude, the findings clearly show that the number of mathematics teachers graduating through the consecutive route has fallen considerably over the past decade. Anecdotally, many might attribute the shortage of mathematics teachers entering the profession through the consecutive route solely to the introduction of the two-year PME. The findings, however, illustrate that this is an overly simplistic explanation. As this research demonstrates, a myriad of complex and interrelated factors at play often interact in a cyclical manner. For example, students who pursue mathematics or mathematically intensive courses at third level have access to a wide range of higher paying career opportunities such as finance, computing, and engineering. The appeal of these higher-paying careers in industry, combined with the demanding and often underappreciated nature of the teaching profession, discourages many from pursuing teaching. Compounding this issue is the relatively low number of students who choose to study mathematics at tertiary level. Consequently, recruiting teachers through the consecutive route from this small cohort is a significant challenge. This creates a cyclical issue, whereby shortages of suitably qualified mathematics teachers contribute to ineffective teaching at secondary level, which in turn discourages students from pursuing mathematics in higher education and ultimately entering the teaching profession (Ní Ríordáin & Hannigan, 2011).



This research highlights the need for policy makers to attend to both the intrinsic and extrinsic factors in encouraging mathematics graduates into teaching, particularly appealing to the love of subject, which should be a consistent message in any programmes attempting to attract teachers to the profession (Whiteford et al., 2021). There is also opportunity for university STEM academics to positively present teaching as a potential career (Demir et al., 2019; Whiteford et al., 2021). Building on what has been learned from international contexts, targeted recruitment strategies, with fees and training salaries covered through competitive application process (e.g., Darling-Hammond, 2017; Jiang & Yip, 2024) could also incentivise those with an interest in teaching to pursue it. Though it is imperative to put appropriate funding structures in place for teacher education and salaries (Marin Blanco et al., 2023), appealing more strongly to social utility values, such as sharing the joy and understanding of mathematics, may be the most effective and sustainable way to attract suitable candidates to the profession.

Corresponding author

Dr Mark Prendergast
University College Cork
Cork, Ireland
mark.prendergast@ucc.ie

Ethical approval

Ethical approval for the research was granted by the Social Research Ethics Committee at University College Cork, and informed consent was given by all participants for their data to be published.

Competing interests

The authors declare there are no competing interests

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Appendix A: Semi Structured Interview Protocol

1. In your opinion, what are the main factors that influence the career choices of mathematics graduates? (Research Question 2 and 3 – Teacher Shortages and Motivation)
2. In general, what do you think are the main challenges that deter mathematics graduates from entering the teaching profession? (Research Question 2 – Reasons for Teacher Shortages)
3. The 2-year PME has contributed to a drop off across all subjects, but the decline in mathematics has been more pronounced than any other subject, why do you think that is the case? (Research Question 2 – Reasons for Teacher Shortages)
4. Are you aware of any other factors that may be contributing to the shortage of qualified mathematics teachers in Ireland? (Research 2 – Reasons for Teacher Shortages)
5. Can you discuss the factors that influenced your decision to pursue teaching after graduating with a mathematics degree? (Research Question 3 – Motivation)
6. In general, what do you think are the main motivations for mathematics graduates to enter the teaching profession? (Research Question 3 – Motivation)