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What are the understandings of dyslexia among primary school teachers in Ireland.

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Abstract

Background: Dyslexia is a learning disability of neurological origin that results in difficulties with recognizing words accurately and/or fluently, poor decoding and spelling abilities, and affects a range of 5% to 20% of students (Bishop & Snowling, 2004; Snowling & Melby-Lervåg, 2016). Effective education of students with dyslexia depends significantly on the pedagogical knowledge of their teachers. **Aims:** The aim of this study was to investigate any differences there may be in knowledge of dyslexia between groups of schools, them being Irish-medium schools, English schools, and DEIS schools. The study also wanted to investigate if teachers in Ireland receive specific training on dyslexia, if years of teaching experience correlates with knowledge of dyslexia, and lastly, if teachers feel they have sufficient resources to accommodate children with dyslexia in their school. **Method:** An online questionnaire was developed, consisting of two different sections. The first of the sections was to gather demographic and background information on the participants. The second section consisted of the 'Knowledge and beliefs about developmental dyslexia scale'(KBDDS), a 37-item scale that was developed to measure participants knowledge of dyslexia. A total of 40 primary school teachers participated in the study with ages ranging from 22-56 (77.5% female). **Results:** The results indicated a suboptimal knowledge of dyslexia among primary school teachers in Ireland, however there was no significant difference depending on the school that you taught in or if you had received specific training or not. There was also no correlation between the number of years teaching experience you had and scores on the KBDDS scale. **Conclusion:** These findings are consistent with previous research that teachers lack some of the essential knowledge regarding dyslexia. Some of the strengths and limitations of the research are discussed, as well as directions for future research.

Introduction

The purpose of this literature review is to provide an overview of the extensive research that has been conducted on dyslexia, a well-known learning disability affecting approximately 3-7% of people which is a significant portion of the population (Bishop & Snowling, 2004; Snowling & Melby-Lervåg, 2016). DSM5 classifies dyslexia as a form of neurodevelopmental disorder which are heritable disorders with life-long conditions with early onsets (Snowling et. al, 2005). Dyslexia was first noted in children in 1896 and has been studied extensively since then (Morgan, 1896). This review will first discuss the definition of dyslexia and its characteristics. Subsequently, the literature surrounding the relationship between teachers' knowledge of dyslexia and how it can affect a child's success in education will be examined. Finally, the challenges involved in assessing dyslexia will be discussed. The aim of this review is to provide a comprehensive understanding of dyslexia and highlight areas where further research is needed.

Dyslexia:

The leading description of dyslexia was developed by Lyon et. al, in 2003, the description states that “dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge” (Lyon et. al, 2003).

The leading definition is correct with all the information, however there is some information that the description does not include. For example, many individuals who are diagnosed with dyslexia suffer from co-occurring deficits in other academic areas, such as mathematics (Fletcher & Loveland, 1986), attention (Shankweiler, et al., 1995; B.A. Shaywitz, Fletcher, & S.E. Shaywitz, 1994), and spelling and written expression (Lindamood, 1996; Moats, 1994). Although there are issues with the earlier definition, it still has relevance as the cognitive features of attention and mathematics deficits are distinct from those linked to impairments in fundamental reading abilities.

Another important thing to consider with dyslexia is the characteristic of difficulty in reading in adults and children who possess the motivation and intelligence for accurate and fluent reading (Shaywitz & Shaywitz, 2003). It is also important to consider that dyslexia is both familial and heritable, with this being one of the most important risk factors (Pennington & Gilger, 1996). Anywhere from 23 to 65 percent of children with dyslexia have at least one parent who reported also having the disorder (Scarborough, 1990). Although there are many tell tale signs of dyslexia it can still be difficult to get a dyslexia assessment, and this is evident in the research that will now be discussed.

Assessing dyslexia:

Generally, people with dyslexia do not have a particular ability profile, which makes it difficult to set a cut off point for a diagnosis, the discrepancy criteria suggests that people with dyslexia have reading and decoding skills below what is expected based on past IQ tests that they have taken (Anderson & Monsrud, 2022). A simple description of what reading is; Reading= decoding x comprehension (Gough & Tunmer, 1986). In the modern world where being able to read fluently is an essential skill for academic success, it is vital to get children

who might have dyslexia assessed as early as possible, for their teachers and parents to apply some of the interventions to help them to be as confident and fluent in their reading abilities as possible (Anderson & Monsrud, 2022). Assessing dyslexia may vary across educational systems, however, there are standard guidelines that are commonly followed, and numerous discernible patterns in the assessment of dyslexia. Firstly, assessment of students is used to give information about what needs and challenges that the student might face in education and what interventions would be most effective for the student and allow the students to perform academically to the best of their ability (Anderson & Monsrud, 2022).

A screener test is an efficient way for teachers to get a general understanding of the reading and spelling level of their class, this would be a test that the teacher could distribute to the whole class to comprehend the reading and spelling level of the individuals in their class (Anderson & Monsrud, 2022). In the case of a screener test there is usually a scoring threshold, for example, children scoring under 20%, the students who fall below the threshold would be followed more closely and would possibly be assessed for dyslexia (Anderson & Monsrud, 2022).

There are some characteristics that are consistent in students with dyslexia and teachers will look out for these characteristics along with the screener test this would give the teachers a better understanding of which students may need to be assessed for dyslexia. Some of the characteristics that are consistent with dyslexia are, difficulty with development of phonological awareness and phonological processing skills, difficulty accurately deciding nonsense or unfamiliar words, difficulty reading single words in isolation, and inaccurate and laboured oral reading to name a few characteristics (Roitsch & Watson, 2019). The full assessment would then be conducted by an educational psychologist, the tests would consist of extensive reading comprehensions and spelling tests. However, there are flaws with the assessment of dyslexia in schools, if a teacher does not have a sufficient understanding of

dyslexia, they would not be aware of these characteristics, and this could lead to children going through the school system without any diagnosis which can have many knock-on effects, such as lacking self-esteem (Dodur & Kumas, 2021).

Teachers' knowledge and understanding of dyslexia:

Although studies focusing on teachers' knowledge of dyslexia have been scarce, nonetheless, the past research has shown that a teacher knowledge and understanding of dyslexia has a direct correlation with a student's success in confident and fluent reading (Dodur & Kumas, 2021). However, studies conducted all over the world have indicated that teachers at both primary and secondary levels of schooling do not have a sufficient knowledge of dyslexia to accommodate students with dyslexia in their class (Dodur & Kumas, 2021). In a study conducted in Turkey in 2021 by Sumer Dodur, set out to investigate the knowledge of dyslexia amongst teachers in Turkey. For this study, the "Knowledge and beliefs about developmental dyslexia" scale was used, this scale was developed by Soriano-Ferrer and Echegaray-Bengoa in Spain in 2014 (Ferrer et. al, 2016) (Dodur & Kumas, 2021), to identify the level of understanding of dyslexia that teachers had in Spain. Some of the more shocking findings of this study was that 27% of the participating teachers reported that they had no knowledge of dyslexia whatsoever, and very few of the participants reported receiving information about dyslexia as part of their bachelor's degree to become a teacher (Dodur & Kumas, 2021). The study showed that most of the teachers that decided to participate in the study did not have enough knowledge or even training in dyslexia, which is consistent with the other studies when it comes to teachers' knowledge of dyslexia, or lack thereof.

Another study that used the same scale as the study, which was discussed above, was a study conducted in 2015 by the same people who created the scale that was used. This study aimed to investigate the differences of knowledge of dyslexia between in-service teachers and pre-service teachers (Ferrer et. al, 2016). The most common misconception in this study was “Dyslexia is caused by visual perception deficits resulting in reversals of letters and words”, only 28.8% of the participants correctly answered this question (Ferrer et. al, 2016). This study showed that in service teachers scored significantly higher with a score 62.2% on average, whereas pre-service teachers scored significantly lower with an average score of 46.8% (Ferrer et. al, 2016). Similarly, to the previously discussed study, only 16.5% of the in-service teachers had received significant training in dyslexia (Ferrer et. al, 2016). This shows that the training system is consistent in the fact that there is a lack of training regarding dyslexia throughout Europe. The lack of training is damaging for the teachers as well as the students, as only 8% of teachers reported that they felt ready to work with a child with dyslexia (Dodur & Kumas, 2021). Once again, it is a startling reality that if a teacher lacks the necessary preparation to assist a dyslexic child, the likelihood of the child receiving appropriate support and resources would be diminished compared to a scenario where the teacher had greater confidence in their ability to work with dyslexic students.

A study conducted across England and Wales focused more on the training of teachers and how effective it is when teaching teachers about dyslexia. This was a large study that gathered quite a bit of traction as 2,600 teachers responded to the online questionnaire (Knight, 2018). Similarly, to the previously discussed studies, the majority (71.8%) of the teachers felt they had not had adequate training in dyslexia whilst doing their teacher training program (Knight, 2018). Furthermore, the teachers were also asked if they had received any additional training in dyslexia after finishing their teacher training, once again the majority (50.4%) of the teachers had received no extra training in dyslexia (Knight, 2018). Similarly,

to the study conducted by Dodur & Kumas, the teachers who had received additional training were more confident and comfortable in teaching a child with dyslexia, and the teachers with extra training had an overall increased knowledge of dyslexia and of the cognitive functions of dyslexia (Knight, 2018). The research addresses a previously unexplored aspect of the literature by affirming that teacher training programs lack comprehensive instruction on the cognitive functions related to dyslexia.

Studies have shown that teachers lack the essential knowledge and skills needed to teach struggling readers, especially children with dyslexia (Washburn et al. 2011). Alongside this, the literature has shown that teachers hold some common misconceptions regarding dyslexia, as discussed in a study conducted by Washburn et al. in 2011. The most common misconception that was discovered in this study was that “seeing words and letters backwards is a characteristic of dyslexia”, 91% of the teachers who participated in this study answered this question as either “probably or definitely true” (Washburn et al. 2011). Misconceptions such as this one is caused due to a lack of knowledge of dyslexia and the influence of popular culture. This study is also consistent with the other studies discussed in this review, as for the question “most teachers receive intensive training to work with dyslexic children”, 87% of the participants answered, “probably or definitely false” (Washburn et al. 2011).

Although the amount of research done on the area of teacher’s knowledge of dyslexia is far from significant. It is clear from the little research available that teachers do lack the knowledge to properly facilitate children with dyslexia. It is also clear from the literature discussed, that teachers feel as if they have not received sufficient training during their time in university or whilst training to become a teacher. Due to the lack of training to do with dyslexia, it is no surprise that the research shows that teachers lack sufficient knowledge of the most common learning disability. Therefore, the purpose of this study was to investigate

the knowledge and understanding of dyslexia among primary school teachers in Ireland from the perspective of different variables. This studies research questions were:

- (1) Is there a difference in the levels of teachers' knowledge of dyslexia in Irish medium schools, English primary schools and DEIS schools?
- (2) Does the amount of teaching experience correlate or predict knowledge of dyslexia?
- (3) Do primary school teachers in Ireland receive specific training in dyslexia, if so what type of training, and do teachers with training score higher on knowledge of dyslexia?
- (4) Is there a difference in the self-reported perception of support available to teachers for accommodating students with dyslexia between Irish and English primary schools?

Method

Participants

To participate in this study, you had to be a fully qualified primary school working in the Republic of Ireland teaching in either an Irish medium-school, English language primary school, or DEIS school. The use of snowball and convenience sampling was implemented to gather participants for the study, with personal contacts I had with the educational sector I was able to ask them to forward on the questionnaire to anyone they felt would be interested in completing it. Participation was purely on a voluntary basis, and this was made clear in the emails sent and throughout the questionnaire. The study was also sent to various schools around Ireland, the email was addressed to the principals as the principal's name and school email addresses are publicly available. A copy of the email is available in appendix C. With teachers and principals being extremely busy during the time that responses were being collected I was only able to get 40 valid participants. 31 (77.5%) Female participants completed the questionnaire, and 9 (22.5%) male participants completed the questionnaire. 14 (35%) of the participants were teachers in English primary schools, 14 (35%) of the participants were teachers in Irish medium-schools, and 12(30%) of the participants were teachers in DEIS schools. The average age of the participants was 38 years old. Ages ranged from 22 to 56.

Design

A between-subjects design was used for conducting this study. In a between-subjects design, each group of participants (in this case primary school teachers from Irish medium-schools, English primary schools and DEIS schools) is treated independently of the other groups, and their responses are compared to determine the effect of the independent variable. This type of

design is commonly used in experimental research when it is not possible or practical to use the same participants for multiple conditions (Keren, 2014). The dependant variable is teachers' knowledge and understanding of dyslexia and the independent variables include whether the participant teaches in an Irish, English or DEIS school, the amount of experience the participant has teaching in a primary school setting, and have they had any formal training in dyslexia.

Materials

Google forms was used to conduct this study. The first section of the questionnaire was a information sheet and a consent form that had to be read and accepted before continuing participation. The next section of the questionnaire was gathering demographic and background information. This section consisted of 7 questions them being, "What gender are you?", "What age are you?", "What type of school do you teach in?", "How many years of teaching experience do you have?", "On a scale of 1-5, how do you think the resources to accommodate students with dyslexia are in your school?", "Have you had any formal training in the area of dyslexia?" and lastly, "If yes, was it part of your university teacher training or CPD which you sought yourself?".

Once these questions were answered the next section of the questionnaire was the *Knowledge and beliefs about developmental dyslexia scale (KBDDS)*. Soriano-Ferrer and Echeagaray-Bengoa (2016) created the KBDDS to gauge the understanding and beliefs of teachers regarding dyslexia. The 36-item scale is organized into three subscales: general knowledge (17 items), diagnosis (10 items), and treatment (9 items). All the items in the scale were to be answered either "True" or "False". This scale has been used in highly cited studies (Dodur, 2021; Knight 2018), the only difference is in the previously mentioned study the participants also had an option to select "I do not know". No reverse scoring was needed for

this scale, every correct answer was a mark and the more marks out of the 37 questions meant a better understanding of dyslexia.

Procedure

After conducting a comprehensive review of the related available literature related to the objectives of the research, a questionnaire was created using a marketing and research software, Google forms. The survey consisted of 7 questions to begin with to gather demographic and background information, then following this there was the KBDDS questionnaire. The survey was then distributed to friends and family in the educational sector and to schools via email (Appendix C). The survey remained open for completion from the 21st of February until the 12th of March, 2023. After clicking the link to grant access to the survey, participants were presented with an information sheet (Appendix D) which outlined the goals of the study as well as an estimated time of how long the study may take. The information sheet also informed participants of withdrawal from the study as well as information regarding informed consent. Also available in the information sheet were the contacts of the student researcher and the research supervisor, both of whom could be contacted if the participants had any questions or queries regarding the survey or the nature of the study. At the end of the information sheet, a brief consent form (Appendix E) was presented to the participants. Participants were given the option to indicate their consent by selecting “Yes”, which would initiate the survey, or to decline consent by selecting “No”, resulting in the end of the participation in the survey. Following the consent form, giving that consent was given by the participant, participants proceeded through the remainder of the questionnaire in the order of demographic and background information, and KBDDS. The section of the questionnaire in which the participant was currently on was shown at the top of the survey. Before participants

submitted their answers, they were provided with a debrief sheet (Appendix F) which thanked the participants for their time and reinstated that the responses were completely anonymous and once the data was submitted it would not be retractable since the data is unidentifiable. Once participants decided to submit their response, another message would be presented to them thanking them for their participation and giving conformation that their response has been submitted.

Ethical considerations

This study was carried out in order with the Code of Conduct of the Psychological Society of Ireland. Before beginning this research project, the proposed materials and methodology were reviewed and accepted by the National College of Ireland's psychology departments board of ethics. As this study was distributed via email, it was important that the study followed the British Psychological guidelines for internet-mediated Research (Hewson & Buchanan, 2017). This set of guidelines outlines four main principles: respect for the autonomy, privacy and dignity of individuals and communities, scientific integrity, social responsibility, and finally, maximizing benefits as well as minimizing harm (Hewson & Buchannan, 2017).

Additionally, this study took measures to uphold participant anonymity and confidentiality during the research, and the information sheet stressed the voluntary nature of the survey and the participants' right to withdraw before submitting their responses. Contact information for both the student researcher and research supervisor was included in case participants had any additional questions about the project or their participation.

Data Analysis

Once the survey was closed, Google forms created a Microsoft Excel file with all the data inputted to it. From here the data was imported to SPSS 27, which is a software used for statistical analysis. Data processing began by firstly recoding some of the items in the scale as the correct answer was false, following this I was able to calculate the scores from the scale and investigate the research questions. Throughout this process the original test literature was referred to for information and guidance.

Results

This study involved a between subject design online questionnaire which was conducted between February and March 2023. This results section will discuss the descriptive and demographic statistics of the sample and will then investigate the results of the Knowledge of dyslexia scale.

(1) Description of participant sample

Before conducting if any statistical tests were done, the data first had to be screened and cleaned, meaning that for any worded answers had to be changed to numbers, in the case of this study the only numbers used were 0,1,2,3. Any incomplete data was removed, and certain variables were recoded where necessary. After making sure all the data was complete there were 40 responses to be analysed. The sample predominantly consisted of female participants (N=31), as most primary school teachers in Ireland are females, the rest of the participants were male (N=9), with no participant selecting the “other” option. Participants were aged between 22 and 56 with a mean age of 38 years old (SD=8.27). There was an unequal distribution of age as most of the participants were aged over 35 years old, this could be due to the teacher shortage that is currently ongoing in Ireland (O’Doherty & Harford, 2018), as well as this the small sample size could have altered the age distribution of participants.

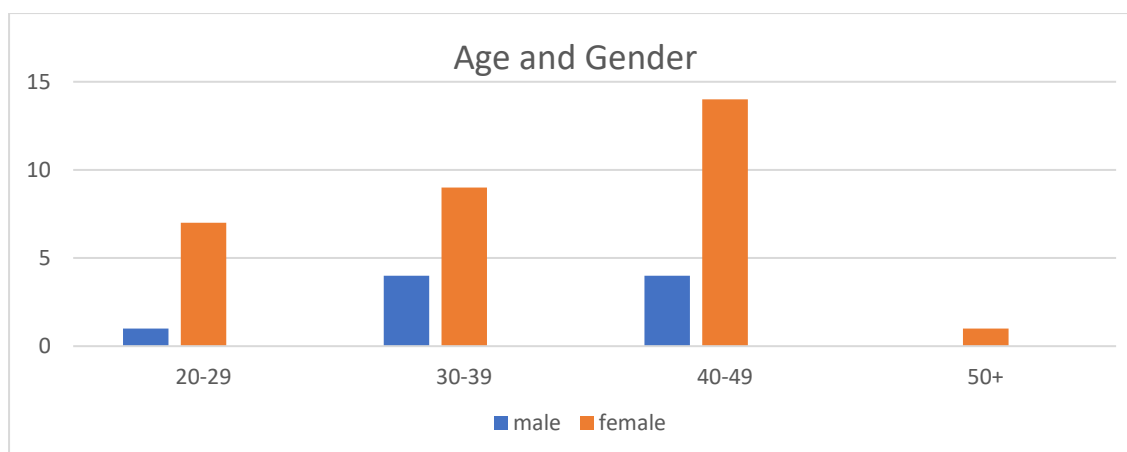


Figure 1: Bar chart representing age and gender distribution.

The next question was to investigate what sort of schools that the participants taught in, the options that the participants could choose from were English primary schools, Irish-medium schools, and DEIS schools. The number of participants teaching in English primary schools was 14 (35%) participants, the number of participants from Irish-medium schools was 14 (35%) participants, and the remainder of the participants were from DEIS schools with 10 (30%) participants.

The next area that was investigated in this study was to investigate if teachers in Ireland receive formal training in the area of dyslexia. If they did receive formal training the participants were asked to specify if it was training they received whilst doing their teacher training in university or if it was a continuing of their professional development (CPD). Out of the 40 responses 21 (52.5%) of the participants reported that they had received formal training in the area of dyslexia, leaving the remaining 19 (47.5%) participants reporting that they have had no formal education in the area of dyslexia. From the 21 participants that received formal training in the area of dyslexia 16 (76.2%) of the participants reported that the formal training that they received was CPD in which they sought out themselves, the remaining 5 (23.8%) participants received mandatory university training in the area of

dyslexia. This shows that from this sample just slightly above half of the participants had formal training in dyslexia.

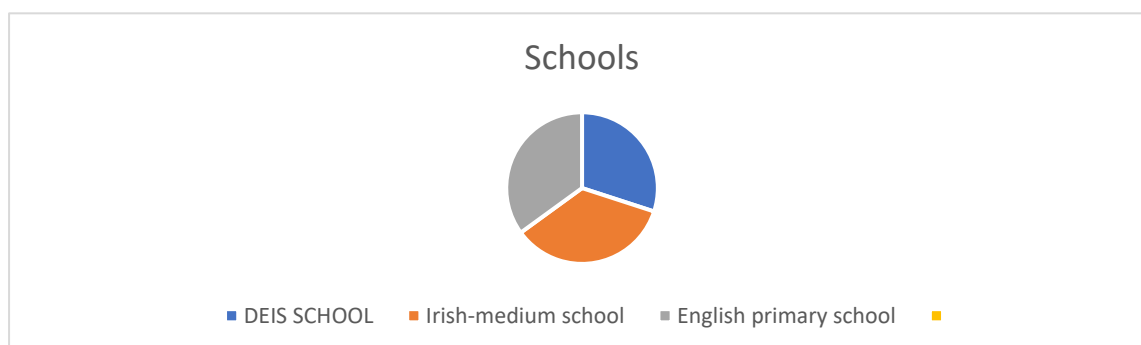


Figure 2: Pie chart displaying the schools that the participants teach in.

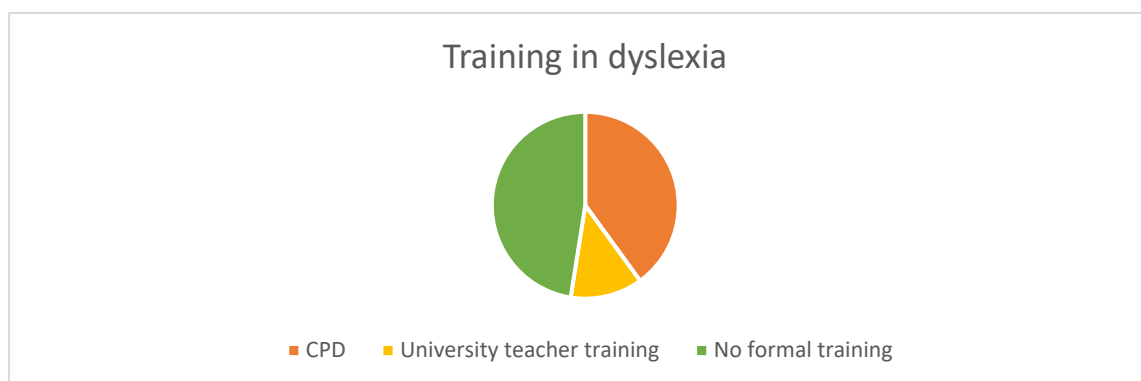


Figure 3: Pie chart displaying the training teachers receive and teachers that do not receive formal training in the area of dyslexia.

One of the research questions that this study was looking to investigate was is there a difference in the self-reported perception of support available to teachers for accommodating students with dyslexia between Irish and English primary schools. As DEIS schools in this study were DEIS schools that teach through English, the researcher decided to merge the responses from DEIS school participants and English primary school participants together. The participants were asked to select an option between 1 (Completely insufficient) and 5 (Completely sufficient) to investigate how the participants felt the resources in their school

were to accommodate students with dyslexia. All 40 participants answered this section, overall, the most common response was 3 on the scale, with 20 responses meaning 50% of the participants selected the option 3. The next overall most selected option was option 4 with 9 (22.5%) of the participants selecting this option, following this option 2 was the third most selected option with 8 (20%) of the participants selecting it. Lastly option 5 was selected by 2 (5%) participants and option 1 (2.5%) was selected by a single participant. After analysing the results and breaking them down between Irish-medium schools (14 participants, 35%) and DEIS + English primary schools(26 participants, 65%), there was a very slight difference between the two categories. The average score on the scale for the Irish-medium school participants was 3.14, whereas for the English and DEIS school participants the average reported score was 3.03. This is not a significant difference between the two groups $F(1,38) = .131, p = .719$. Although there was no significant difference between the two groups, the average score of 3.08 overall between the two groups is still quite low. The graph below shows the distribution of scores.

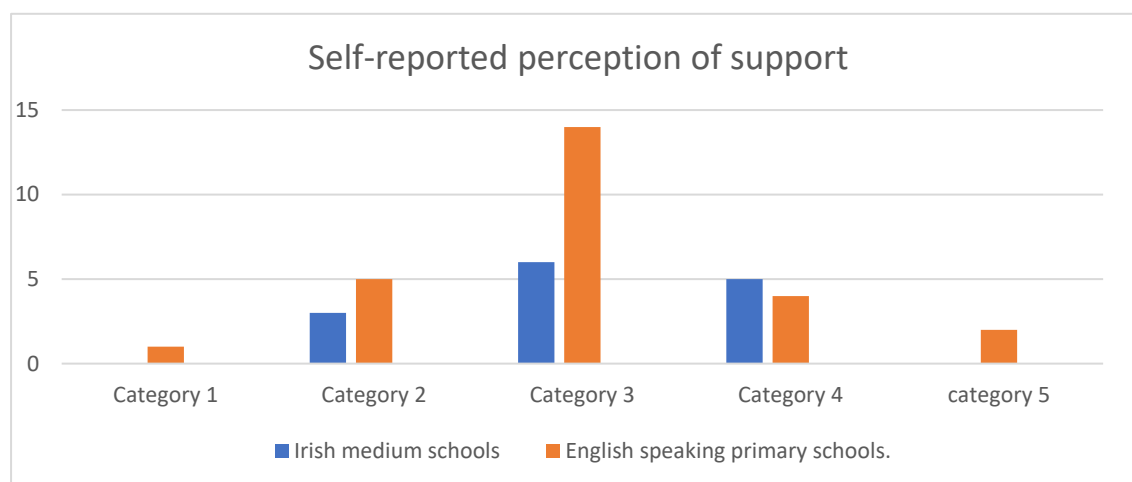


Figure 4: Bar chart displaying the distribution of scores on the self-report perception of support in primary schools.

The last of the background information that was to be investigated was how much teaching experience the participants had, this was necessary to investigate correlation between teaching experience and knowledge of dyslexia. 3 of the participants had either a year or less of experience of teaching full time, and the 2 participants with the most experience reported was 26 years of teaching experience. The average amount of experience reported by the participants was 13.38 years of experience.

(2) Assessment of knowledge of dyslexia

The first analysis that was done was to discover if there was a difference between the different groups of schools and how the participants from the different schools scored on the KBDDS. To investigate this a between groups ANOVA was utilised. Before investigating this, it was first necessary to investigate the overall score of all the participants on the KBDDS scale. From the 40 participants the mean score was 27.78 (SD=2.82) with a range from 21 correct answers to 33 correct answers. This shows that not a single participant got all 37 questions correct, and the majority got less than 30 correct answers. The between groups ANOVA indicated that there is no significant difference between teachers in DEIS school, English primary schools, and Irish-medium schools' knowledge of dyslexia $F(2,37) = .869$, $p = .438$ according to this sample. Although DEIS school participants had the highest mean score there was still no significant difference between the different groups within this sample. The scores are shown in table 1 below.

Table 1

Descriptive statistics on knowledge and beliefs about developmental dyslexia scale (KBDDS)

Variable	<i>M</i> [95% CI]	<i>SD</i>	Range
English primary school	27.29 [25.88, 28.69]	2.431	23-31
Irish-medium school	27.50 [25.68, 29.32]	3.156	21-32
DEIS school	28.67 [26.84, 30.49]	2.824	25-33

As the KBDDS can be broken into 3 subscales, them subscales being general information, treatment of dyslexia, and symptoms of dyslexia. After analysing these 3 subscales it was found that participants scored highest on the general information about dyslexia scale with approximately 31 of the participants answering the questions correctly. The sample from this study scored lowest on the symptoms subscale with only 26 of the participants answering the questions correctly. The three most common misconceptions were, Dyslexia is caused by visual-perception deficits, producing the reversal of letters and words, which was only answered correctly by 15 (37.5%) participants, “Seeing letters and words backwards is a basic characteristic of dyslexia”, was only answered correctly by 14 (35%) participants, lastly, “Children with dyslexia can be helped by using coloured lenses/coloured overlays” was answered correctly by only 12 (30%) participants. The three most commonly correct answers were “Difficulty with the phonological processing of information is one of the most important deficits in dyslexia” all 40 (100%) participants answered this question correctly, “A child can be dyslexic and gifted”, was also answered correctly by every participant (100%), and lastly, “Many students with dyslexia have low self-esteem” was answered correctly by 39 (97.5%) of the 40 participants.

The next research question that was to be analysed was if there was any correlation between years of teaching experience and scores on the KBDDS scale. To investigate for correlation between experience and scores on the KBDDS scale, linear regression was used. Linear regression is used to investigate correlation between a dependant and an independent variable, in this case years of experience and knowledge of dyslexia. There was no correlation between years of teaching and knowledge of dyslexia, Pearson's correlation was .213, this was not significant with $p=.188$. Therefore, according to this sample there is no correlation to years of teaching experience and knowledge of dyslexia. The assumptions for normality, independence, and homogeneity of variance were not violated but ultimately the assumption of linearity was violated, this was observed by looking a scatterplot of the dependent variable vs the independent variable.

The next area to analyse was to discover if teachers with specific training in the area of dyslexia score better on the KBDDS scale in comparison to teachers who have not had specific training in the area of dyslexia. as previously discussed in section (1) it is clear that from the sample not all teachers receive training in the area of dyslexia, and the majority of the participants who had training had sought out the training themselves as CPD. This answered the first half of the research question being "do primary school teachers in Ireland receive training in the area of dyslexia? If so what type of training?", now the second part of that research question will be answered, "do teachers with specific training score higher than teachers without specific training". With the overall mean score of all the participants being 27.78, the group of 21 participants with specific training scored slightly higher than the overall mean with a score of 28.48. This mean score was slightly higher than the score of the remaining 19 participants who reported not having any specific training in the area of dyslexia with a mean score of 27. Even though there is a noticeable difference between the two mean scores of the group with and without training

in dyslexia. There was still no significant difference between those who have had extra training, and those who had reported not having any extra training in the area of dyslexia $F(1,38) = 2.856, p = .099$. This was analysed using a between groups ANOVA once again, Levene's test was also used for this analysis, it was once again insignificant, illustrating the homogeneity of variance assumption was not violated $p = .748$. This alongside the results discussed in section (1) gives a sufficient answer to research question (iii) "Do primary school teachers in Ireland receive specific training in dyslexia, if so what type of training, and do teachers with training score higher on knowledge of dyslexia?" according to this sample, some teachers receive specific training in the area of dyslexia but that does not necessarily mean that they have a greater knowledge of dyslexia.

Discussion

In the context of primary schools in Ireland, a large scale study investigating the knowledge of dyslexia among teachers has not been done, meaning that there are no previous findings on the matter in context of Ireland. Nonetheless the participants involved in this study showed an inadequate knowledge of dyslexia with the lowest score of 21 points and the highest score of 33 points, showing that not a single fully qualified teacher participant got full marks on the scale. Before further discussing the findings of the research, the limitations will be discussed briefly.

Limitations:

This study contains some limitations that merit consideration. One of the limitations in the study was the sampling techniques that were utilized to gather participants. Due to the lack of time and resources, convenience sampling and snowball sampling were utilized. An email containing information about the questionnaire with the link to the questionnaire was sent to various schools to try to recruit more participants. Ideally the study would have had approximately 30 participants per group of schools but unfortunately due to the lack of time and the sampling techniques utilized, this number of participants was not reached. Results may have been more significant if there were more participants involved in the study. For future research in this area, the use of a open-ended interview with teachers alongside the questionnaire, may be a more efficient way to investigate knowledge of dyslexia among a smaller sample such as the one in this study. Furthermore, with future study on teachers' knowledge of dyslexia, another scale would be useful to investigate different variables, for example, if there was a scale for "attitudes towards dyslexia". A scale like this would be useful alongside the KBDDS scale to investigate if teachers with a worse attitude towards dyslexia score lower on the knowledge of dyslexia scale. As well as this the KBDDS scale

only shows the knowledge of dyslexia of participants, it does not show if one teacher is better than teaching a child with dyslexia than another teacher, regardless of the score.

Another limitation worth considering, was the manner in which self-reported perception of support was reported by the participants. In this study the participants were asked to report “on a scale of 1-5, how do you think the resources to accommodate students with dyslexia in your school”. A few problems can arise with 1-5 scales, for example the 1-5 scale provides a relatively limited range of options for participants to choose from. This can lead to lack of nuance in the collected data, as participants may not be able to accurately convey the degree of their opinion or perception of a particular topic. For instance, in the case of this study half of the participants selected option 3, hypothetically, if this was investigated on a scale from 1-100, 3 could range from 40-60 which is a massive difference to merely a 3 on the scale. To eliminate this from happening in future research, a more suitable phrasing of the question might be, “do you believe your school has sufficient resources to accommodate the children with dyslexia in your school?” and this would be answered with either a yes or no. Due to the manner in which this question was asked and reported alongside the small sample were reasons for not getting a significant difference between the different groups of schools.

Discussion:

The study at hand set out to investigate primary school teachers knowledge of dyslexia in Ireland. Primary School teachers in Ireland teach students between ages 4 and 12 years old. For this study, a scale of knowledge and beliefs about developmental dyslexia was utilized. This study showed from this sample that teachers had an inadequate knowledge of dyslexia, and many of the participants held common misconceptions. The results of this study bear similarities to studies conducted all around the world (e.g., Li et al. 2011; Wadlington &

Wadlington 2005) showing that the misconceptions of dyslexia among teachers is a universal occurrence. Studies have shown that anywhere from 5%-20% of people experience some aspect of dyslexia, with the average primary school classes in Ireland consisting of 23 students, this means that in the average classroom in Ireland there could be between 1 and 4 students with dyslexia. With dyslexia being the most prevalent learning disability in classrooms all over the world, teachers should display more knowledge on the subject. It is necessary for children with dyslexia to learn interventions to help them deal with dyslexia and to perform to their ability in the educational setting, but a child will not know the interventions if the teacher has no knowledge on the interventions. For example, one of the more common incorrect answers on this study at hand was, “Children with dyslexia can be helped by using coloured lenses/coloured overlays”, the correct answer for this question is false but 28 (70%) participants of this sample responded that this statement was true, and only 12 (30%) of the participants answering the question correctly. This finding is consistent with the findings of previous research which suggest that teachers’ dominant misconceptions of dyslexia are that it is a visual disability (Dodur & Kumas, 2021; Washburn, Joshi, and Binks-Cantrell, 2011). this is also consistent with the study at hand as 26 (65%) of participants answered true to “Seeing letters and words backwards is a basic characteristic of dyslexia”, when in fact the correct answer was false with only 14 (35%) of the participants answering correctly.

On a more positive note, teachers showed knowledge in understanding that dyslexia is a reading and spelling disability and has nothing to do with intelligence or IQ, the questions that investigated this on the KBDDS scale were, “People with dyslexia have below average Intelligence” all 40 participants answered this question correctly. This is shows similarities to other studies investigating teachers’ knowledge of dyslexia such as Wadlington and Wadlington 2005, this study consisted of a larger sample but still the majority of the sample

answered this question correctly. It is evident that teachers have some of the essential knowledge surrounding dyslexia, it is still inadequate. The mean score of the overall sample with the study at hand was 27 correct answers out of 37. To put this in terms of percentage, the mean score was approximately 73%. Although this is a reasonable score, seeing as most teachers will teach a child with dyslexia due to its prominence, in a perfect world all teachers would score 100%, but there are many factors as to why this is not the case, such as the lack of mandatory training.

One of the research questions that this study was based upon, was do teachers in Ireland receive specific training on the area of dyslexia, and if so what type of training. From the sample at hand, it was clear that not all teachers in Ireland receive training. This is a theme all over the world as a study conducted in turkey showed that only 5.8% of the participants received information about dyslexia through their teacher training (Dodur & Kumas, 2021). With only 21 of the participants reporting that they had received training in the area of dyslexia which was only slightly over half of the participants at 52.5%. 76.2% of the sample that reported having received specific training in the area of dyslexia received the training through CPD that they sought out themselves, meaning that it was not mandatory training, and that they may have had to even pay for the training out of their own pocket. The remaining 23.8% of participants reported that they received their training whilst undergoing university teacher training. With the lack of mandatory training, it is no surprise that teachers lack some of the essential knowledge around dyslexia. For further research it may be necessary to ask college students who are currently training to become a teacher if they had received any training on dyslexia, and to get them to complete the KBDDS scale to investigate if their knowledge of dyslexia is superior to the knowledge of teachers with no mandatory training.

An area which has not been explored whatsoever before this current study, is how teachers teaching in Irish-medium schools differ to teachers from DEIS schools and English primary schools. Interestingly, there was no evidence of significance between the scores of the different groups of schools. This was also the case with the self-reported perception of support available, the limitations surrounding this aspect of the questionnaire have already been answered in the limitations section of the discussion. With regards to the scores on the KBDDS scale and the groups of schools, the sample size may have played a role in the lack of differences between groups. With future research, the sample size would have to be significantly larger to investigate this research question. However, within the sample in the study at hand there were no significant differences in knowledge of dyslexia and the school that the participant teaches in.

The last of the research question was to investigate if teachers with more experience score better on the KBDDS scale. It was discovered that within this sample there was no evidence that experience correlated with a higher score on the KBDDS. This was analysed using linear regression. With further research in the area, an accompanying question such as “To your knowledge have you worked with a child with dyslexia”, along with a question like this and a larger sample size, there might be more correlation between years of teaching experience and knowledge of dyslexia, although in the study at hand there was no significant correlation between years of teaching experience and knowledge of dyslexia.

Conclusion

The results of this study are consistent with prior findings (Dodur & Kumas, 2021) and further suggests that teachers show suboptimal levels of knowledge of dyslexia in Ireland. Through gaining insight into the training that teachers receive in Ireland or lack

thereof, it is clear that mandatory training in the area of dyslexia is necessary to give adequate support to children with dyslexia. It was also discovered that the majority of the participants felt that they only had 'somewhat sufficient' resources for accommodating children with dyslexia in their institution. This makes it clear that more research is necessary on the resources available through English and Irish as all teachers should feel that the resources are sufficient to accommodate children with dyslexia in their own class group. Further research in this field should also examine the manner in which teachers receive information and training on dyslexia in Ireland, as only approximately half of the participants involved in this study received training specifically around dyslexia. As it is the most common learning disability, it is clear that more research should be conducted surrounding teachers and dyslexia as a teacher can help a child with dyslexia fulfil their potential in education.

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Appendix A

Background questionnaire

1. Gender
2. Age
3. What type of school do you teach in? (Irish-medium school, English primary school, DEIS school)
4. How many years of teaching experience do you have?
5. On a scale of 1-5, how do you think the resources to accommodate students with dyslexia are in your school (Likert scale, 1- completely insufficient, 5- completely sufficient)
6. Have you had any formal training in the area of dyslexia?
7. If yes, was it part of your university teacher training or CPD which you sought yourself?

Appendix B

Knowledge and Beliefs about Developmental Dyslexia Scale

1. Dyslexia is the result of a neurologically based disorder.
2. Dyslexia is caused by visual-perception deficits, producing the reversal of letters and words.
3. A child can be dyslexic and gifted.
4. Dyslexic children often have emotional and social disabilities.
5. The brains of individuals with dyslexia are different from those of people without dyslexia.
6. Dyslexia is hereditary.
7. Most studies indicate that about 5% of school-age students have dyslexia.
8. Dyslexia has a greater occurrence in males than in females.
9. Children with dyslexia are more consistently impaired in phonemic awareness (i.e ability to hear and manipulate sounds in language) than any other ability.
10. Modeling fluent reading is often used as a teaching strategy.
11. People with dyslexia have below average Intelligence.
12. The reading of students with dyslexia is often characterized by inaccuracy and lack of fluency.
13. Seeing letters and words backwards is a basic characteristic of dyslexia.
14. Difficulty with the phonological processing of information is one of the most important deficits in dyslexia.
15. Intelligence tests are useful in identifying dyslexia.
16. All poor readers have dyslexia.
17. Children with dyslexia can be helped by using colored lenses/colored overlays.
18. Physicians can prescribe medications to help students with dyslexia.
19. Multisensory instruction is not an effective training method at the moment.
20. Students who have reading disabilities without an apparent cause are called dyslexic.
21. People with dyslexia are not stupid or lazy. Knowing about the term helps children.
22. Giving students with dyslexia accommodations, such as extra time on tests, shorter spelling lists, special seating, etc., is unfair to other students.

23. Intervention programs that emphasize the phonological aspects of language with the visual support of letters are effective for students with dyslexia.
24. Most teachers receive intensive training in working with dyslexic children.
25. I think dyslexia is a myth, a problem that does not exist.
26. Repeated reading techniques are useful reading material to improve reading fluency.
27. Problems in establishing laterality (body schema) are the cause of dyslexia.
28. Students with dyslexia need structured, sequential, direct instruction in basic skills and learning strategies.
29. Dyslexia refers to a relatively chronic condition that is often not completely overcome.
30. Many students with dyslexia continue to have reading problems as adults.
31. Many students with dyslexia have low self-esteem.
32. Children with dyslexia have problems with decoding and spelling but not with listening comprehension.
33. Applying an individual reading test is essential to diagnosing dyslexia.
34. Dyslexics tend to spell words wrong.
35. Dyslexia usually lasts for a long time.
36. Dyslexia is characterized by difficulty with learning to read fluently.

Appendix C

Email sent to participants.

To whom it may concern,

Hello, my name is Darragh Ó Cadhla I am a final year psychology student currently studying in the National College of Ireland. I am inviting you to participate in a quick online questionnaire which looks to investigate teachers' knowledge of dyslexia in primary schools in Ireland. This questionnaire is part of my final year project, and any responses will be completely anonymous. Participation in this study is purely on a voluntary basis and is not mandatory, you will have the option to withdraw from participation whilst still in the process of doing the questionnaire, however once the questionnaire is submitted withdrawal will not be possible as the questionnaire is anonymous and there will be no way to identify your answers. Any responses would be greatly appreciated but I would like to reinstate that it is purely voluntary and there will be no repercussions should you decide not to complete this questionnaire. Additionally, no one, bar yourself, will know if you took part or not. If you have any questions about the study do not hesitate to ask me or my supervisor who' contact details will be linked below.

Kind Regards,

Darragh Ó Cadhla

Appendix D

Information sheet.

-What is this study about?

My name is Darragh Ó Cadhla and I am a final year psychology student in the National College of Ireland. As a part of my degree, I must carry out an independent research project. The research aims to investigate teachers in Ireland's knowledge of dyslexia, and to investigate if there is a difference in teaching experience and knowledge, and what language the teachers teach through.

-What will taking part in this study involve?

If you decide to take part in this research, you will be asked to complete an online questionnaire which asks true or false questions about dyslexia. It should take no more than 15 minutes to complete.

-Who can take part in this study?

If you are a fully qualified primary school teacher currently teaching in Ireland, you are eligible to participate in this study. If you are working as a part-time teacher, you may still participate in this study if you are fully qualified.

-Do I have to take part in this study?

You do not have to take part in this study, participation in this study is voluntary, and even if you decide to withdraw from the questionnaire halfway through you can just exit the browser and your data will be deleted. Once you have submitted your questionnaire, it will not be possible to withdraw your data from the study, because the questionnaire is anonymous and individual responses cannot be identified.

-What are the possible risks and benefits of taking part?

There are no direct benefits to you for taking part in this research, however, the data gathered might contribute knowledge around dyslexia awareness and supports available to teachers and pupils in primary schools in Ireland.

-Will taking part be confidential and what will happen to my data?

Responses to the questionnaire will be fully anonymised and stored securely in a password protected/encrypted file on the researcher's computer. No identifying information is collected as part of the research. You are not asked to include your name or the name of the school you work in. Data will be retained and managed in accordance with the NCI data retention policy. Note that anonymised data may be archived on an online data repository and may be used for secondary data analysis.

-What will happen to the results of the study?

The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland and may be presented at conferences and/or submitted to an academic journal for publication.

-Who should you contact for further information?

If you have any further questions or queries you can contact me on my college email address which is x20439526@student.ncirl.ie.

If you have any further questions or queries you can also contact my supervisor, Dr Conor Nolan, at conor.nolan@ncirl.ie

Thank you very much for reading this information sheet.

Appendix E
Consent sheet.

In agreeing to participate in this research I understand the following:

-The method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.

- I understand that once my participation has ended, that I cannot withdraw my data as it will be fully anonymised.

- I have been informed as to the general nature of the study and agree voluntarily to participate.

- All data from the study will be treated confidentially. The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business.

- I understand that my data will be retained and managed in accordance with the NCI data retention policy, and that my anonymised data may be archived on an online data repository and may be used for secondary data analysis. No participants data will be identifiable at any point.

- At the conclusion of my participation, any questions or concerns I have will be fully addressed.

YES X

NO X

Appendix F

Debrief sheet.

Study title: What are the understandings of dyslexia among primary school teachers in Ireland.

Thank you for participating in this study for my final year psychology project for the National College of Ireland.

The questions that you completed will now be analysed and will undergo a variety of statistical procedures that allow the researcher to make significant observations that can add to the scientific literature. This study was conducted under the supervision of Dr. Conor Nolan.

Once again, the responses you have submitted will remain completely confidential and your identity will remain anonymous. As a result, the data you have submitted will not be able to be redacted once completed. Furthermore, the data collected in this study will be reported to my college class group and possibly published. If you have any further questions or queries about the study, please do not hesitate to contact me using the contact details below.

Many thanks,

Contact information:

Student Email: x20439526@student.ncirl.ie

Supervisor email: Conor.nolan@ncirl.ie

Appendix G

SPSS Data file and Output.

The screenshot shows the IBM SPSS Statistics Viewer interface. The main window displays the following statistical output:

Tests of Homogeneity of Variances

Score	Leverage Statistic	df1	df2	Sig.
Based on Mean	.198	1	38	.659
Based on Median	.105	1	38	.748
Based on Median and with adjusted df	.105	1	35.037	.748
Based on trimmed mean	.156	1	38	.695

ANOVA

Score	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21.737	1	21.737	2.856	.099
Within Groups	289.238	38	7.612		
Total	310.975	39			

ANOVA Effect Sizes^{a,b}

Score	Point Estimate	95% Confidence Interval	
		Lower	Upper
Eta-squared	.070	-.000	.252
Epsilon-squared	.045	-.026	.233
Omega-squared Fixed-effect	.044	-.026	.228
Omega-squared Random-effect	.044	-.026	.228

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
b. Negative but less biased estimates are retained, not rounded to zero.

Bootstrap Specifications

The screenshot shows the IBM SPSS Statistics Data Editor interface. The main window displays a data table with 60 variables. The first 25 rows are visible, showing data for variables: Score, Gender code, Gender, irish_english_school, Age, Whattypeofschoolyouattend, r_Schools, Howmanyyears ofteachingexperienceyouhave, Onascaleof15 howdoyouthinktheresources., Trainingre coded, Haveyouhadanyformal traininginthe, typeoftrainingcode d, and ifyeswasitpartof yoursc.

Score	Gender code	Gender	irish_english_school	Age	Whattypeofschoolyouattend	r_Schools	Howmanyyears ofteachingexperienceyouhave	Onascaleof15 howdoyouthinktheresources.	Trainingre coded	Haveyouhadanyformal traininginthe	typeoftrainingcode d	ifyeswasitpartof yoursc.
27	1	Female (incl trans)	1	39	Irish primary school.	2	18	2	2	yes		1 CPD
25	1	Female (incl trans)	1	22	Irish primary school.	2	1	3	1	No		0
25	1	Female (incl trans)	2	31	DEIS school.	3	10	3	1	No		0
29	1	Female (incl trans)	2	29	DEIS school.	3	7	3	1	No		0
26	1	Female (incl trans)	2	39	DEIS school.	3	9	3	2	yes		1 CPD
30	2	Male (incl trans)	1	31	Irish primary school.	2	6	4	1	No		0
33	1	Female (incl trans)	2	42	DEIS school.	3	20	3	2	yes		1 CPD
29	1	Female (incl trans)	2	45	DEIS school.	3	20	3	1	No		0
30	1	Female (incl trans)	2	47	DEIS school.	3	23	5	2	yes		1 CPD
23	1	Female (incl trans)	1	47	Irish primary school.	2	26	3	1	No		2 university teacher
29	2	Male (incl trans)	2	38	English primary school.	1	11	4	1	No		0
25	1	Female (incl trans)	2	56	DEIS school.	3	21	3	2	yes		1 CPD
29	1	Female (incl trans)	1	37	Irish-medium school.	2	17	4	2	yes		2 University teacher
26	2	Male (incl trans)	2	38	English primary school.	1	18	2	1	No		0
28	2	Male (incl trans)	1	47	Irish-medium school.	2	25	2	1	No		1 CPD
30	1	Female (incl trans)	2	42	DEIS school.	3	20	3	2	yes		1 CPD
29	1	Female (incl trans)	1	44	Irish-medium school.	2	21	3	1	No		0
31	1	Female (incl trans)	2	38	English primary school.	1	16	3	2	yes		1 CPD
29	1	Female (incl trans)	1	45	Irish-medium school.	2	20	3	1	No		0
21	1	Female (incl trans)	1	24	Irish-medium school.	2	0	4	2	yes		2 University teacher
26	1	Female (incl trans)	2	47	English primary school.	1	25	3	2	yes		1 CPD
32	1	Female (incl trans)	1	26	Irish-medium school.	2	5	4	2	yes		1 CPD
26	1	Female (incl trans)	1	30	Irish-medium school.	2	2	4	1	No		0
29	1	Female (incl trans)	2	46	English primary school.	1	26	4	1	No		0
30	2	Male (incl trans)	1	30	Irish-medium school.	2	3	3	1	No		0