Policy before research in bilingual education in Spain: teacher perceptions in STEAM classrooms

Louisa Mortimore
Universidad Internacional de la Rioja (España). Universidad de Alcalá de Henares (España).
louisa.mortimore@unir.net
https://orcid.org/0000-0003-3239-4350

Abstract
The last two decades have seen the implementation of numerous different bilingual programmes across Spain. This has resulted in many children having free access to bilingual education in the country for the first time. However, the reduced time frame has resulted in policy and implementation far outreaching results-based research. This has direct implications on the quality of educational programmes. Currently there is no legislation that stipulates specific training in bilingual methodologies, despite significant bodies of research pointing to the need for training in Content and Language Integrated Learning (CLIL). Furthermore, STEAM subjects are commonly included in these bilingual programmes through primary and secondary education and are therefore disproportionally affected. In this context, this study aims to determine the perceptions of bilingual teachers towards their training, preparation, and praxis in a bilingual programme. Data collection took place over five years, in a bilingual primary school in Madrid, through two validated questionnaires. Results are in line with existing literature and indicate a need for improved training in methodology. All teachers agreed there was an additional workload and that the use of CLIL methodologies in class had helped their pupils learn more effectively.

Keywords: educational policy; bilingual education; teacher training; teacher perceptions; STEAM.

[es] Políticas sobre educación bilingüe al margen de la investigación. Percepciones del profesorado STEAM en España.

Resumen
Tras veinte años de crecimiento exponencial en la implantación de programas bilingües en España, muchos niños tienen acceso gratuito a la educación bilingüe por primera vez. Sin embargo, el ritmo acelerado ha dado lugar a políticas que sobrepasan la investigación basada en resultados, lo cual impacta negativamente en la calidad de los programas. La legislación no estipula la necesidad de que los profesores partícipes tengan una formación en metodologías bilingües, a pesar de que la investigación

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

24

apunta a la necesidad de formación en Aprendizaje Integrado de Contenidos y Lenguas Extranjeras (AICLE). Además, la inclusión de las materias STEAM en estos programas bilingües afecta de manera desproporcionada a la enseñanza de estas. Este estudio tiene como objetivo determinar las percepciones de los docentes bilingües hacia su formación y praxis en un programa bilingüe. La recogida de datos se llevó a cabo durante cinco años en un colegio bilingüe de primaria en Madrid, con dos cuestionarios validados. Los resultados se alinean con la literatura existente y atestiguan la necesidad de mejorar la formación metodológica. Todos los profesores coincidieron en que, a pesar de una mayor carga de trabajo, el uso de metodologías AICLE contribuyó a un aprendizaje más eficaz.

Palabras clave: políticas educativas; enseñanza bilingüe; formación del profesorado; percepciones del profesorado; STEAM.

1. Introduction: policy before research

The last twenty years has seen exponential growth in the implementation of bilingual programmes across Spain. From small beginnings in the 1990's, the next two decades have seen the implementation of numerous different bilingual programmes across the country. This has resulted in many children having free access to bilingual education for the first time.

However, rapidly evolving educational legislation has resulted in a lack of a clear national legislative framework within which to implement and develop bilingual education, with each educational authority creating their own policy on bilingual education, independent of the other educational authorities in the country. It is furthermore evident that the optimal development of bilingual education must include not just the educational authorities, but the whole of the educational community (Sanchez-Verdejo Pérez, 2021).

The challenges created by this lack of cohesion has been compounded by the reduced time span in its implementation, resulting in insufficient empirical data which would more clearly demonstrate the effects that bilingual education may, or may not, have across multiple aspects of the educational system in the long term. The existence of quality empirical data allows policy makers to base decisions on studies rather than an ideology, belief, or intuition; thus, possibly mitigating negative effects and optimising the benefits. In effect, it could be said that, without existing research, policy makers have been operating blind. In many cases, educational policies have been put in place before the existence of empirical data upon which to base said policies. This has, arguably, resulted in the passing of policies and laws which are based more on political ideologies than scientific research.

The somewhat haphazard provision within schools has direct implications on the quality of its educational programme. Over the last two decades, school staff have struggled to adapt to a new educational programme, often with limited guidance, support, and training. With administrations placing considerable emphasis on the expansion of the numerous bilingual programmes, schools, teachers, and students appear to be in a lottery postcode: the quality of the bilingual programme and its provision depends on the educational authority the school depends on, the type of school, the management team, and the teachers.

In this regard, one major area of concern is whether teachers were prepared to teach their subjects within bilingual programmes. Bilingual programmes are often centred around the teaching of core content subjects in the additional language. These include Natural Sciences (e.g., Physics, Chemistry,

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

25

and Biology), Social Sciences (e.g., History and Geography), Arts and Technology, frequently referred to as STEAM. While there is general consensus that everyone needs to be STEAM literate (Zollman, 2012), the question must arise, how is this to happen effectively if the learners are taught the content in another language by teachers who are not trained in specific bilingual methodologies?

2. Theoretical Framework
This section will review the legislative framework regulating the implementation of bilingual programmes in Spain. Firstly, it will consider the beginnings, explore its rapid growth, and examine the case of the bilingual programme in Madrid. Secondly, the paper will evaluate some of the differences between another major bilingual programme in the country, that of Andalusia, before analysing how these differences affect their implementation. This will be followed by a review national legislation. Lastly, the paper will consider the impact on teacher training and STEAM learning environments.

2.1 Bilingual education in Spain: small beginnings.
The introduction of the *Programa Educativo Bilingüe* (henceforth PEB) in 1996 was born from the partnership between The Ministry of Education, Culture and Sport (henceforth, Ministry of Education) and the British Council. It arguably represented a small start in terms of investment but a considerable advancement in innovation. The methodology is characterised by a focus on literacy, the development of linguistic, scientific, and intercultural competencies in both Spanish and English with an integrated curriculum from Spain and the UK.

Until 2004, this was the only bilingual programme that offered the teaching of content subjects in an additional language such as English. 25 years after PEB was first implemented, the programme has grown to 90 state Infant and Primary and 57 Secondary schools in ten autonomous regions in 2021 (*Ministerio de Educación y Formación Profesional*, 2021). While considered a success by the Spanish Ministry of Education and the British Council (2010) in terms of performance, attainments, good practice and perceptions, this success is not reflected in the same very high growth in the number of participating schools that has been achieved by other, later, bilingual programmes in Spain.

2.2. Bilingual education in Madrid: a case of accelerated growth
Nearly a decade after the start of PEB, the autonomous communities, as the authority responsible for local education, began to roll out their own bilingual education programmes. Different autonomous communities rolled out the programme with different speeds. One of the regions that could be said to have rolled it out the fastest in schools is the CAM, under the name Programme for State Bilingual Schools [*Programa de Colegios Públicos Bilingües*]. This name was later changed to the Bilingual Programme for the Community of Madrid [*Programa Bilingüe de la Comunidad de Madrid* – henceforth, CAM's Bilingual Programme] as charter, and state Secondary schools and colleges of Further Education- Baccalaureate and Vocational Training (FP) were included in the programme.

In 2004-2005, the CAM's Bilingual Programme started with 26 Primary schools (*BOCM 4902/2004).* 17 years later, in 2020-2021, there were 1037 state and charter Primary and Secondary schools, and colleges in the Bilingual programme in the CAM (*Consejería de Educación, Universidades, Ciencia y Portavocía de la Comunidad de Madrid*, 2021, p.35). This is an increase of 3,988%, nearly forty-fold, in 16 years.

State Secondary schools became bilingual in the CAM in 2010-11. Within state Secondary, the bilingual programme is divided into two types, Programme (*Programa*) and Section *(Sección).* In Section, all content, including STEAM subjects such as Physics, Chemistry Biology, Geology, Art and Design, Music, Computer Studies, Robotics, Technical Drawing and Technology may be taught in English. In addition, the subject of EFL in Section follows an advanced linguistic programme (*BOCM, 972/2017*). As in Primary, the sole exceptions are Maths, Spanish and a 3rd Language.

2.3. Different bilingual programmes in different autonomous communities
In a country where education is devolved, each of the 17 autonomous communities has passed its own local educational law (always subject to the Organic Law of Education valid at the time). 12 of these are monolingual regions, each with its own policies and requirements for the implementation of additive

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

26

bilingual education in schools in that area. Across the country, this has resulted in 17 policies, each regulating their bilingual programme differently. These differences are numerous and include fundamental issues. As stated in the Eurydice report, in Spain "the situation varies widely from one Autonomous Community to the next" (2006, p.47) with as many educational models as there are educational authorities (*Asociación Enseñanza Bilingüe*, 2021).

To compare just two autonomous communities, Madrid and Andalusia, variations between their policies include: i) the subjects that can be taught in the additional language; ii) the amount of L1 permitted in the teaching of those subjects; iii) the evaluation systems in place; and iv) the level of proficiency in the L2 required by teachers.

2.4. Lack of national legislative framework? Changing educational laws in Spain

Within this setting of diverse local bilingual educational policies, the educational community in Spain has, furthermore, witnessed the effects of four major national laws in education (and a fifth law that was repealed) in 20 years, each passed by successive governments from alternate sides of the political spectrum. While educational policy is devolved, all local educational laws are subject to the national organic laws of education. All organic laws must be approved, modified, or repealed by absolute majority in Congress (Spanish Constitution, 1978, article 81).

To take a starting point, 1990 saw the enactment of the General Organic Law of the Education System (*Ley Orgánica General del Sistema Educativo de 3 de octubre de 1990*), known as the LOGSE, passed by the Spanish Socialist Workers Party (henceforth, PSOE). In 2002, the Organic Law on the Quality of Education (*Ley Orgánica 10/2002, de 23 de diciembre, de Calidad de la Educación*), the LOCE was passed in 2002 by a majority Popular Party (henceforth, PP) vote. The LOCE however was repealed by the entering PSOE party and never enacted. Four years later, the Organic Law of Education was passed in 2006 (*Ley Orgánica 2/2006, de 3 de mayo, de Educación*), known as the LOE, by the PSOE coalition government. The LOE was followed in quick succession seven years later with the Organic Law for the Improvement of the Quality of Education (*Ley Orgánica, 8/2013, de 9 de diciembre, para la Mejora de la Calidad Educativa*), referred to as the LOMCE, passed by the standing PP government. Another seven years later, in 2020, the Organic Law Amending the Organic Law of Education of 2006, (*Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación*), known as the LOMLOE, was passed by the PSOE coalition, coming into force on January 19th, 2021. The text of the LOMLOE (2021) is critical of its predecessor LOMCE (2013), reverting many of the changes made in said law, while highlighting the benefits of the 2006 LOE. The LOMCE has since been repealed.

2.5. Implications for STEAM classrooms: disproportionality affected.

As mentioned previously, bilingual programmes are often centred around the Natural Sciences (e.g., Physics, Chemistry, and Biology), Social Sciences (e.g., History and Geography), Technology and Arts (Castillo-Rodriguez & Prat Fernández, 2022). Depending on the educational authority, maths may also be taught in the additional language. Madrid does not allow Maths to be taught in English (BOCM *5958/2010*, article 3), but Andalusia does, and states only that Social and Natural Science should be preferential (BOJA, *Acuerdo de 22 de marzo de 2005*, article 2.3.2, p. 17; BOJA, *28 de junio de 2011*, article 14).

A direct result of administrations placing considerable emphasis on the expansion of bilingual programmes is the lack of teachers that are specialised to teach STEAM subjects in bilingual contexts. Therefore, the teaching and learning processes surrounding these subjects are disproportionally affected by bilingual educational policies, programmes, and their implementation in schools.

2.6. STEAM classrooms and teacher training

There is a considerable body of research that supports a need for improved methodology in bilingual schools (see for example, Hernando et al., 2018; Laorden & Peñafiel, 2010). With Europe and Spain, the methodology associated with specific bilingual teaching methodologies is Content and Language Integrated Learning (CLIL). Some educational authorities have specifically referenced CLIL (e.g., BOCM 5958/2010), in their legislation of bilingual education. Nevertheless, within Spain no educational

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

27

legislation exists that requires specific methodological training to teach in a bilingual programme, over and above the general teacher certification. Indeed, it is notable that in bilingual schools none of the main actors within that bilingual school, including the principal, bilingual coordinator, teachers, nor language assistants, are required to have any specific methodological training in bilingual education.

The qualifications to teach in a bilingual programme, as opposed to general education, are linguistic, rather than methodological. In addition to a standard teaching degree, content teachers in Primary are required to certify a B2 or C1 in the additional language, depending on the autonomous community. English teachers must have the speciality of English in their teaching degree. Bilingual secondary teachers, in addition to a degree in the area of speciality (i.e., Humanities or Science) and a masters to teach in Secondary Education, must again have a language certificate in B2 or C1.

This lack of requirement of specific methodological training occurs despite teacher training needs in a bilingual or plurlingual programme being more complex than for monolingual programmes (see, for example, Sanz Trigueros & Guillén Díaz, 2021). Teachers require three tiers of training: i) quality pedagogical teacher training; ii) language training to reach and maintain their own L2 level, and iii) specific training in bilingual methodologies to enable content to be taught effectivity through the pupils' L2. This last is the most specific, and possibly the stage more teachers are likely to miss out (Custodio Espinar & García Ramos, 2019). As with all innovation in education, there is a need for additional specialised training when teaching methods require the change from teaching English to teaching in English (Bárcena-Toyos, 2020; Porto Currás et al., 2019). In addition, Halbach (2015) states that the success of any innovation in teaching depends on its application in the classroom, and specifically, bilingual education has special characteristics which require specific teacher training. Pérez Cañado (2017) also reports that while considerable strides have been made, there is still a need for troubleshooting in bilingual teacher training. This has often led to criticism of bilingual programmes, undermining the undeniable potential of these programmes which offer free access to bilingual education.

3. Objectives and research questions

Within this complex educational backdrop, this article centres on teachers' perceptions and experiences, considering them to be a critical part of the puzzle to explore the reality of STEAM bilingual classrooms. The research has taken place as part of a longitudinal case study of one school in Madrid and follows the transition to bilingual education over the course of five years, to analyse teacher perceptions towards the bilingual programme they teach within and how these may have changed over the course of the five years.

In light of the above, this paper addresses the following research questions:

1. What are the teachers' views towards training within a bilingual programme?
2. Have teachers' perceptions and attitudes towards the bilingual programme in their school undergone significant change after participating in the programme for five years?

4. Method

The present research took place with teachers in a bilingual primary school in Madrid.

4.1. Research design

An initial pilot study was carried out to ensure viability. All instruments of measurement were validated.

The intervention consisted of three types of training and support:

- Training in CLIL Methodology with a 9-month course of post graduate certificate in CLIL methodology (*Experto Unviersitario en metodologia CLIL)* at the Universidad Internacional de la Rioja,
- Training in English language with a 9-month course with the possibility of sitting a C1 Cambridge Advanced standardised exam,

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

28

- Mentoring and accompaniment for in-school training.

4.2. Sample

As a longitudinal study, fieldwork took place over five academic years, between September 2016 and June 2022. Measures were taken in year one, two and five. The 23 participants worked in the same bilingual primary school in Madrid.

4.3. Ethics and data protection

Signed permission has been obtained from the school head and participants. The identity of all parties has been protected and anonymised.

4.4. Data collection

Teachers were asked to self-reflect on their teaching practice on two separate validated questionnaires. Measurements were taken in years 1, 2 and 5. Firstly, the validated Teacher Reflection Form (henceforth TRF) was a critical reflection questionnaire with 4 open-ended questions for qualitative analysis on their use of methodology, and 6 closed questions on their perceptions of the bilingual programme. Closed questions used a Likert scale of 1-6, with 6 being "totally agree". Each closed question was followed by a space to allow participants to add any observations and comments they chose. These were ad hoc questions, designed explicitly to determine attitudes to the changes made in the bilingual department in this school. Secondly, the validated CLIL Programme Evaluation for Teachers (Pérez Cañado, 2016, p.94-100), henceforth referred to as CET, was administered to enable extensive quantitative analysis and facilitate comparison across the data sets. It consisted of 61 closed questions to enable quantitative analysis and includes answers based on a 4-point Likert scale, with 4 being "Totally agree".

4.5. Data analysis

Data was analysed using the statistical programmes, IBM SPSS, version 25, for quantitative analysis. Analysis used the significance criterion of 10% (α .10), to ensure that the interpretation of the p-value is not overly influenced by the sample size (Cohen, 1992). The measures of central tendency (the mean, median and mode) and dispersion (standard deviation and range) were calculated using descriptive statistics to determine if scores had increased. Finally, Cronbach's coefficient of reliability was used to determine internal consistency within each teacher's answer set. Parametric and non-parametric tests have been run to ensure reliability and the correct interpretation of test results. Qualitative data was coded for analysis and triangulated with quantitative data to provide understanding and insights.

5. Findings and discussion

To answer the objectives and research questions in this study, the following section will analyse the teachers' answers to the two questionnaires to determine their views and perceptions towards a range of aspects related to the development of the bilingual programme in their school, including training, workload, and praxis.

The responses to the 6 closed questions in TRF indicated a very positive attitude to the development of the bilingual department, showing a high mean and median score. Standard deviation was correspondingly low, indicating that teachers gave points in a similar range. Cronbach's coefficient of reliability was used to determine internal consistency within the scores given by each teacher for each item within their questionnaire. In this regard, internal consistency was acceptable showing a result of .718, indicating that each teacher answered with relatively similar scores throughout.

In contrast, internal consistency scores from the CET for year 2 show low internal consistency of .550 versus relatively high consistency in year 5, with .842. With the same subjects and items in each dataset, a possible explanation for this sharp increase is that the answers of at least one teacher, and likely multiple teachers, were considerably more consistent across all their answers in year 5 as compared to year 2. This could indicate a higher level of surety, or confidence when answering in year 5 as compared to year 2.

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

29

5.1. Teacher perceptions towards training

The importance of continued teacher training for both language and content teachers was reflected across the answers of all teachers, in both questionnaires, in years 2 and 5. One teacher added the comment that they considered training to be a decisive factor:

> "*Considero decisivo la formación permanente del profesorado*" [I consider continuous teacher training to be a decisive factor] (T4, year 2)

This attitude was reflected in two items in the CET questionnaire (items 38 and 39), which asked two very specific questions regarding training. Item 38 asked if *foreign language teachers (AL) need more training*, and item 39, whether *the content teachers (ANL) need more training*. Answers to both items, in both years, show relatively high agreement that teachers need more training, as reflected in figures 1 and 2:

Figure 1.
Mean in years 2 and 5 of responses to items 38, foreign language teachers (AL) need more training; and item 39, the content teachers (ANL) need more training (Likert scale 1-4).
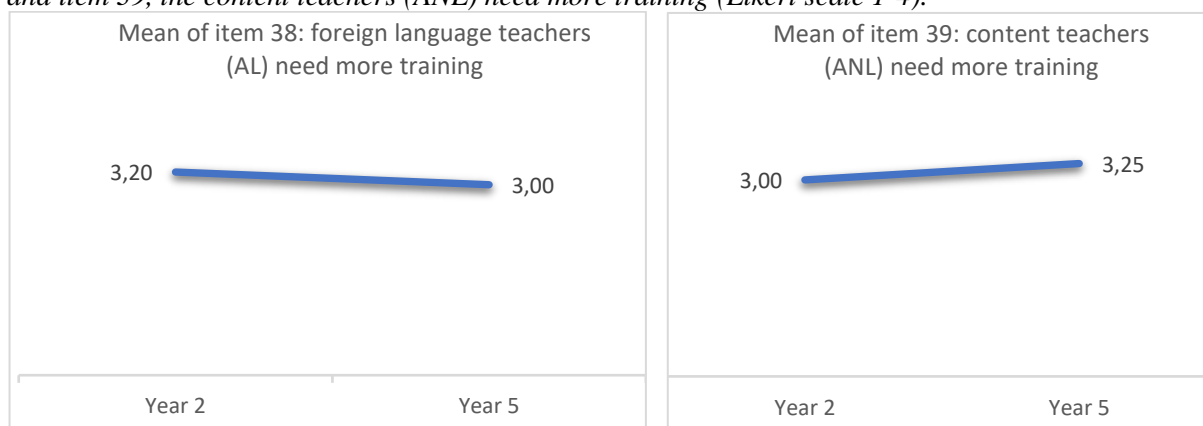
(Author's own, 2022)

As can be seen in the graphs, there is no statistical difference between year 2 and 5. Teachers' responses indicated a similar belief in the importance of training in both year 2 with a mean of 3.2 ($\bar{x} = 3.20$) and year 5 with 3.0 ($\bar{x} = 3.0$) out of a maximum score of 4. This was similar to the perception of the need for training in content with a mean of 3.2 in year 2 ($\bar{x} = 3.20$) and year 5 with 3.25 ($\bar{x} = 3.20$), respectively. Indeed, upon reading the question, one teacher commented out loud.

> "Of course! Teachers always need more training. No training is ever enough!" (T4, Year 2. quotation marks added).

However, while the teachers agreed that both linguistic and specific methodological training was necessary to teach in bilingual programmes, this parity is not reflected in legislation with only a certificate in linguistic competence being required by the Administration, over and above the teaching degree required for all teachers in general education. In addition, teachers perceived a need for continued professional development. Within this study, CLIL specific training took place in year 1. However, by year 5, four new teachers had joined the department, four years after the initial CLIL training programme. Their comments in year 5 as follows, reflect this need for continued professional development training:

> "More CLIL training [is needed] and more cohesion between grade levels and subjects. I haven't had any training," (T22, year 5).

> "I think the way of implementing CLIL has not been as good as it could be. I talk from my own point of view. I have not received enough training to maximise project-based learning. In my own case, I have also been given subjects in which I am not an expert," (T21, year 5).

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

30

The view expressed appears to show some disenfranchisement and frustration of being asked to teach subjects for which the teacher felt ill prepared or had little knowledge of. However, this also calls into the question the quality of pre-service teacher training all teachers must necessarily undergo for certification. Training should prepare teachers to teach all subjects on the national curriculum. Furthermore, project-based learning is not a new phenomenon. Nor is it CLIL specific. The teachers' comment appears to suggest it is the responsibility of the school to train teachers to use this well-known and widely used technique, whereas, in all logic, it should be covered in pre-service teacher training.

Moreover, this raises the important issue of the need for continued and frequent CLIL specific training sessions in bilingual contexts. The teachers' comments suggest that teacher training should be *continuous* to refresh the teachers' practice with new ideas and provide support. Likewise, training should be *frequent* because schools are dynamic workplaces where teachers change positions and schools, as reflected in the high staff rotation over the period of five years witnessed in this study. The need for frequent training programmes is underlined by T22 who joined the school five years after the initial CLIL training programme and had not received any CLIL specific training.

Overall, teachers seem to agree that that training in CLIL has helped them, but the lack of continued training does appear to be a problem. While changes detected from year 2 to year 5 are not statistically significant, they may reflect a broader tendency. This has implications for the long-term success of CLIL. Furthermore, the school no longer benefits from the training support in Primary from the Universidad Internacional de la Rioja. While educational authorities do run occasional training programmes run by local authorities, access is limited and voluntary. A long-term training programme needs to be set up by the school management team to ensure the continuation of effective implementation of CLIL, and maintain a highly trained and motivated teaching staff, and minimise the sense of disfranchisement. These are critical factors to ensure long term success, as highlighted by research (e.g., Laorden & Peñafiel, 2010; Porto Currás et al., 2019).

5.2 Teacher perceptions towards the workload of teaching in a bilingual programme

Reported attitudes towards workload did not reveal a positive trend. A frequent teacher complaint was the lack of time. Indeed, one teacher made a comment in year 1 in this regard, and made a similar comment in their feedback a year later, in year 2:

> *Hay poco tiempo para lo mucho que queremos hacer, al final nos quedamos con muchas cosas en el tintero* [There isn't much time to fit in everything that we want to do, in the end loads gets left undone] (T5, year 1).

> *¡¡Me gustaría tener tiempo sobre todo!!* [Above all, I'd like to have enough time!!] (T5, year 2).

A downward trend was revealed over the course of the study as the bilingual programme developed and gained momentum. To allow a closer inspection of this trend, scores were analysed of the CLIL Evaluation for Teachers' questionnaire (CET), representing attitudes in year 2 and year 5, thus allowing comparison of the opinion of all teachers between these three years. In this regard, two items from the CET referred to belonging to, and collaborating with, the bilingual department. In these items we can compare the mean of the responses from year 2 and from year 5, from all teachers including two that are newly incorporated into the programme in year 5, and a further two who joined in year 4.

The first of these two questions, item 57, asks if being part of a bilingual department is worth the extra work required (*formar parte de una sección bilingüe compensa el incremento de trabajo que implica*). In the graph below, we can see the answers from the seven teachers who have worked in the department since at least year 2 and therefore participated in both measures, and in blue all teachers that worked in Primary at the time of the measure. The first measure in year 2 was taken in the same year as the restructuring of the bilingual department and is therefore a highly relevant snapshot of opinions in that moment towards the changes being made. In contrast, year 5 represents views three years later.

Figure 2.

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

31

Mean in years 2 and 5 of responses to item 57 (CET), being part of a bilingual section is worth the extra work required.

(Author's own, 2022)
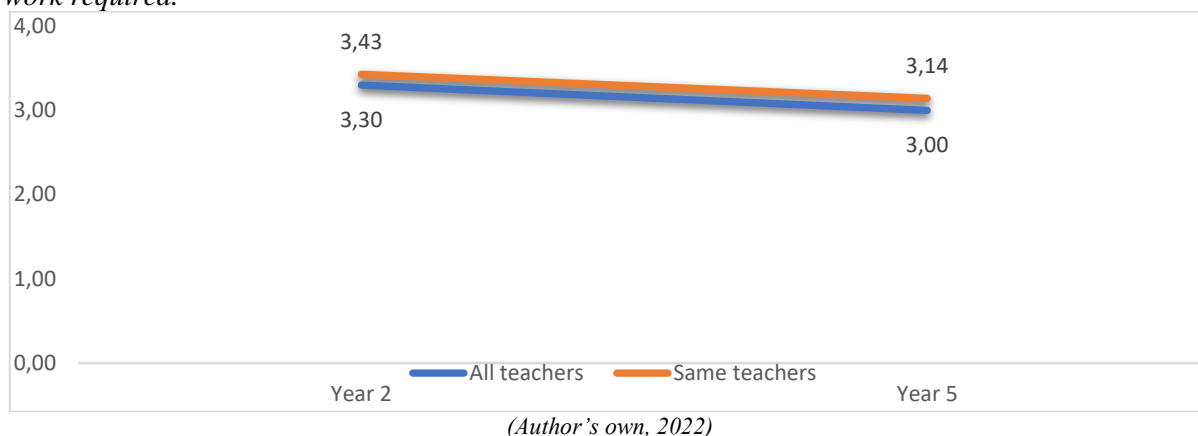
Responses in both measures indicate agreement. Nonetheless, a slight but nonsignificant reduction from year 2 to year 5 can be observed from both groups. These findings are in line with studies into teacher perceptions (Fernández Fernández & Halbach, 2011; Hernando et al., 2018; Salvador García & Chiva Bartoll, 2017). Mortimore (2019, p. 326) reported one teacher, in their first year of working with CLIL, as commenting "I was working all Sunday." For this extra dedication in bilingual programmes in Madrid, participating teachers generally receive a plus for productivity, though this varies between educational authorities. However, the number of teaching hours remains the same as it does for general teachers. In contrast the next item 58, *I collaborate with the elaboration, adaptation and implementation of the Integrated Language Curriculum* shows the opposite tendency.

Figure 3.
Mean in years 2 and 5 of responses to item 58 (CET), I collaborate with the elaboration, adaptation, and implementation of the Integrated Language Curriculum.

(Author's own, 2022)
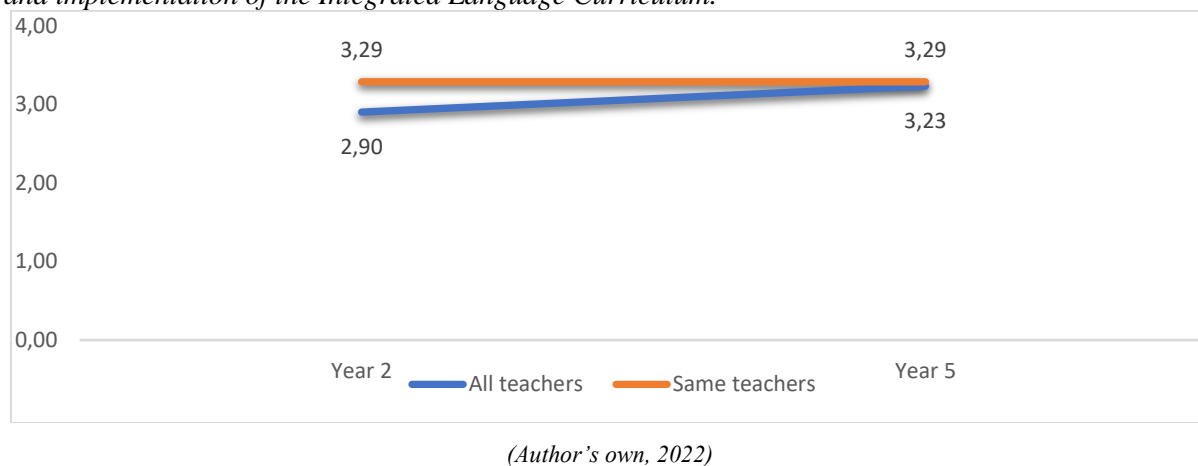
The feedback from all teachers indicates that, with the creation of the department, they had more control of their subjects and material, while the feedback from the teachers with several years' experience in the school, remains stable.

5.3 Teacher perceptions towards praxis in a bilingual classroom
From year 1 to year 5 there is a perceptible difference in the overall attitude towards bilingual teaching methodologies such as CLIL, and acceptance of using CLIL in class. This is in line with findings by Bárcena-Toyos (2022) and Antropova et al., (2021) who found that teachers who participate in a

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

32

bilingual programme, but who do not identify as a bilingual teacher, do not tend to use CLIL methodologies in their classes.

During data collection in year 1, there was a notable resistance to CLIL within certain teachers in Primary and Secondary, reflected in this comment from a teacher in Secondary:

"*Yo soy partidaria de mantener el bilingüismo en mi asignatura sólo en 1º y 2º de ESO. En cursos superiores, creo que se pierde más de lo que se gana*" [I am in favour of maintaining bilingualism in my subject only in 1st and 2nd year of ESO. In higher years, I think you lose more than you gain.] (Arts Teacher in Secondary, Year 1).

The teachers' viewpoint is fair- research is less clear in this regard (Hughes & Madrid, 2020). It should be noted that the teacher's comment was in line with the status quo at that time- The subject of Arts taught by this teacher was taught in English in 1-2nd ESO and in Spanish from 3rd ESO onwards. This lack of coherency neither facilities the teacher's planning and teaching, nor does it encourage the teacher to perceive the changes brought about by the transition to a bilingual programme in a positive light.

With preparation time in year 1 spent on knowing the subject content to teach, an identified consequence was the over-reliance on textbooks. Teachers relied on the textbook to familiarize themselves with the content they had to teach and therefore planned accordingly, with the questions and activities they were reading in the textbook. Feedback from year 1 reflects the opinion that textbooks are viewed as a necessary aid, but used in excess:

In terms of awareness of active methodologies, fours teachers commented on the need to reduce the reliance on textbooks in year 1 in STEAM classrooms. This was especially true in Science classrooms, where completion of the textbook was expected:

Me gustaría tener los medios suficientes para eliminar el libro de texto en Science [I would like to have enough means to eliminate the textbook in Science] (T1, year 1).
Personally, I'd like to have more autonomy and see the curriculum less coursebook based (T11, year 1).
I'd love to be able to use project-based learning and CLIL in my classes without using textbooks, but in order to achieve this, we would all have to plan the curriculum together and produce quality resources. We would also need intensive training (T3, year 1).
The most important thing I think I should change is NO textbooks and NO homework (T15, year 1).

With the introduction of active methodologies and project-based learning in year 2 onwards after CLIL training, no more feedback on books was offered in following years. In this regard, the question, *whether using CLIL in my class has helped my pupils learn more effectively*, had the objective of determining the teachers' attitudes towards the development of their class practice in STEAM classrooms. Responses indicated very high levels of agreement, with a high mean ($\bar{x}$ = 5.50), a median of 6, and low standard deviation S = 0.65), as can be seen in the following table:

Table 1.
Results from all teachers' feedback from year 5. Steam Classrooms. Teacher Reflection Form (TRF)

Prompt	Mean ($\bar{x}$)	S Dev (S)	Median	Min.	Max.
I think using CLIL in my class has helped my pupils learn more effectively	5.50	0.65	6	4	6

Answer is based on a Likert scale 1-6. (Author's own)

All teachers responded to this question, with feedback reflecting positive views towards the use of CLIL in the classroom. In this line, T14 wrote the following observation:

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

33

I can tell they really learn lots of English (without realizing it), thanks to the fact that everything is taught within a context (T14, year 5).

Feedback from the teachers appears to agree that, overall, using CLIL has helped their pupils learn more effectively, including in the STEAM subjects of Natural and Social Science, Robotics, and Arts. These positive views have been maintained between years 2 (immediately after they received training) and year 5 (three years after training). Views in year 5 are particularly important as they reflect the long-term belief that using CLIL does aid, and has aided, effective learning in the bilingual classroom.

6. Conclusions

While the introduction of widespread bilingual programmes in state and charter schools has resulted in free and easy access to bilingual education for all, the haste of educational authorities to bring in widespread bilingual programmes, combined with the lack of preparation of the educational community in terms of teacher training and support, has been in great part responsible for much of the criticism these programmes have faced.

This was especially clear in terms of training, with teacher feedback evincing the importance of CLIL specific training. This study contributes to the standing literature by revealing the noticeable difference in the feedback from teachers who had received this training, and later member of staff who joined after the training had already taken place. The former expressed their satisfaction, while the latter included teachers who expressed their dissatisfaction and inability to carry out their functions as they would like to. All of the teachers in this second group expressed their desire to receive CLIL specific training, suggesting that teacher professional development should be treated as an ongoing and contextualised experience. This is especially necessary for effective learning within STEAM classrooms as these subjects are typically included in bilingual programmes. Similarly, continued reflective development is key to teachers' pedagogical growth. This study highlights that specific CLIL training was viewed as contributing to the improved teaching praxis and more effective learning in STEAM classrooms. The findings of this study provide evidence to support the need for investment in the continued maintenance and optimisation of both bilingual programmes and teacher training.

The logistics of a longitudinal study in a dynamic context such as a school, created a significant challenge, as the educational sector is highly dynamic, and the data collected in this longitudinal study is a reflection of that dynamic reality. In this regard, the variables encountered, and the challenges they posed, are precisely the factors that enable the extrapolation of results from this case study to other schools, as they are reflective of schools across the educational sector. A natural progression of this study would be to revisit the school and analyse classroom praxis in five years' time.

Referencias

Antropova, S., Poveda Garcia-Noblejas, B., & Carrasco Polaino, R. (2021). Teachers' Efficiency of CLIL implementation to Reach Bilingualism in Primary Education. *Revista De Estilos De Aprendizaje, 14*(27), 6–19. https://doi.org/10.55777/rea.v14i27.2822

Asociación Enseñanza Bilingüe (September 2021), *Manifiesto de la Asociación Enseñanza Bilingüe*. https://www.ebspain.es/index.php/blog/446-manifiesto-eb

Bárcena-Toyos, P. (2020). Teachers' classroom practices to achieve integration of content and language in CLIL. *NABE Journal of Research and Practice, 10*(3-4), 94-106.

Bárcena-Toyos, P. (2022). Teacher identity in CLIL: A case study of two in-service teachers. *LACLIL, 15*(1), e1516, https://doi.org/10.5294/laclil.2022.15.1.6

BOCM (2010) Orden 5958/2010, de 7 de diciembre, de la Consejería de Educación, por la que se regulan los colegios públicos bilingües de la Comunidad de Madrid. http://www.madrid.org/wleg_pub/servlet/Servidor?opcion=VerHtml&nmnorma=7014

BOCM, (2017). Orden 972/2017, de 7 de abril, de la Consejería de Educación, Juventud y Deporte, por la que se regulan los institutos bilingües español-inglés de la Comunidad de Madrid. B.O.C.M. [Boletín Oficial de la Comunidad de Madrid], de 27 de abril de 2017. Núm. 99. http://w3.bocm.es/boletin/CM_Orden_BOCM/2017/04/27/BOCM-20170427-11.PDF

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

34

BOJA, (2005). Acuerdo de 22 de marzo de 2005, del Consejo de Gobierno, por el que se aprueba el Plan de Fomento del Plurilingüismo en Andalucía. BOJA [Boletín Oficial de la Junta de Andalucía] de 05 de abril de 2005. Núm. 65 https://www.juntadeandalucia.es/boja/2005/65/5

Castillo-Rodríguez, C., & Prat Fernández, B. (2022). Cooperative learning in the CLIL classroom: Challenges perceived by teachers and recommendations for Primary Education. *Educatio Siglo XXI, 40*(1), 79-106. https://doi.org/10.6018/educatio.433411

Cohen, J. (1992). Statistical power analysis. *Current directions in psychological science, 1*(3), 98-101. https://doi.org/10.1111%2F1467-8721.ep10768783

Consejería de Educación, Universidades, Ciencia y Portavocía de la Comunidad de Madrid, (2021). *Datos y Cifras de la Educación 2021-2022*. Annual report in education in the CAM by Delegación del Gobierno de Bilingüismo y Calidad de la Enseñanza. https://www.comunidad.madrid/publicacion/ref/50489

Constitución Española. BOE [Boletín Oficial del Estado] núm. 311, de 29 de diciembre de 1978. https://www.boe.es/eli/es/c/1978/12/27/(1)

Custodio Espinar, M., & García Ramos, J. M. (2020). Medida de la competencia para programar AICLE y diagnóstico de las necesidades de formación docente. *Bordón. Revista De Pedagogía, 72*(1), 31–48. https://doi.org/10.13042/Bordon.2019.72250

Eurydice. (2006). *Content and Language Integrated Learning (CLIL) at school in Europe*. Published by the Eurydice European Unit with financial support from the European Commission. https://op.europa.eu/en/publication-detail/-/publication/756ebdaa-f694-44e4-8409-21eef02c9b9b

Fernández-Fernández, R., & Halbach, A. (2011). Analysing the situation of teachers in the CAM bilingual project after four years of implementation. Content and Foreign Language Instructed Learning. *Contributions to Multilingualism in European Contexts*. Peter Lang.

Halbach, A. (2015). Una reflexión oportuna: la formación inicial del profesorado en CLIL. En *Formación inicial para profesores de programas bilingües en inglés: políticas, prácticas y recomendaciones* pp. 17-20. UAH/British Council.

Hernando Garijo, A., Hortigüela Alcalá, D., & Pérez Pueyo, Á., (2018). Percepción de coordinadores de programas bilingües y docentes de Educación Física en inglés en secundaria sobre el proceso de implantación y desarrollo del bilingüismo en la Comunidad de Castilla y León. *Retos: nuevas tendencias en educación física, deporte y recreación,* (33), 63-68. https://dialnet.unirioja.es/servlet/articulo?codigo=6367727

Laorden, C., & Peñafiel, E. (2010). Proyectos bilingües en los centros de la Comunidad de Madrid: Percepción de los directivos. *Revista de Investigación Educativa, 28*(2), 325-326.

Ley Orgánica 1/1990, de 3 de octubre, de Ordenación General del Sistema Educativo (LOGSE). Disposición derogada. Boletín Oficial del Estado (BOE) 238 de 4 de octubre de 1190 https://www.boe.es/eli/es/lo/1990/10/03/1

Ley Orgánica 10/2002, de 23 de diciembre, de Calidad de la Educación (LOCE) [Repealed]. Boletín Oficial del Estado (BOE), 307. https://www.boe.es/boe/dias/2002/12/24/pdfs/A45188-45220.pdf

Ley Orgánica 2/2006, de 3 de mayo, de Educación (LOE), (2006, 4th May). Boletín Oficial del Estado (BOE), 106 de 4 de mayo de 2005. https://www.boe.es/eli/es/lo/2006/05/03/2/con

Ley Orgánica, 8/2013, de 9 de diciembre, para la Mejora de la Calidad Educativa (LOMCE), (2013, 10th December). [Repealed] Boletín Oficial del Estado (BOE), 295, de 10 de diciembre de 2013. https://www.boe.es/eli/es/lo/2013/12/09/8

Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación (LOMLOE), (2020, 30th December). Boletín Oficial del Estado (BOE), 340 de 30 de diciembre de 2020. https://www.boe.es/eli/es/lo/2020/12/29/3

Ministerio de Educación & The British Council, Spain (2010). *Bilingual Education Project. Evaluation report*. Joint report by Instituto de Formación del Profesorado, Investigación e Innovación Educativa (IFIIE) and The British Council, Spain. Evaluation by Dobson, A., Pérez Murillo, M.D., & Johnstone, R. https://www.britishcouncil.es/sites/default/files/bilingual-education-project-spain-evaluation-report-en.pdf

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

35

Ministerio de Educación y Formación Profesional, (2021). [Government website related to content on the *Programa Educativo Bilingüe*-PEB]. https://www.educacionyfp.gob.es/mc/british-council/programa.html

Mortimore, L. (2019). Effective learning in the bilingual Natural Science Primary classroom. A case study. *Nuevas técnicas docentes,* 313-328. Pirámide.

Pérez Cañado, M.L. (2016). Evaluating CLIL programmes: Instrument design and validation. *Pulso. Revista de Educación 39*, 79-112. http://hdl.handle.net/10017/28338

Pérez Cañado, M.L. (2017). CLIL teacher education: Where do we stand and where do we need to go. Bilingual Education: Educational Trends and Key Concepts/Educación Bilingüe: *Tendencias Educativas y Conceptos Clave,* 129-144. https://sede.educacion.gob.es/publiventa/descarga.action?f_codigo_agc=18722

Porto Currás, M., Lova Mellado, M., & Bolarín Martínez, M. J. (2019). Formación del profesorado de Programas Bilingües en centros de Educación Primaria en la Región de Murcia. *Revista de investigación en educación*, (2) 69-85. https://dialnet.unirioja.es/servlet/oaiart?codigo=7284990

Salvador García, C., & Chiva Bartoll, Ò. (2017). CLIL in teaching physical education: Views of the teachers in the Spanish context. *Journal of Physical Education and Sport, 17*(3), 1130-1138. https://doi.org/10.7752/jpes.2017.03174

Sánchez-Verdejo Pérez, F. J. (2021). Evolución de la enseñanza bilingüe en etapas previas a la universidad en Castilla-La Mancha. *Revista De Estilos De Aprendizaje, 14*(27), 20–32. https://doi.org/10.55777/rea.v14i27.2734

Sanz Trigueros, F. J., & Guillén Díaz, C. (2021). Adaptación y desarrollo profesional docente de los especialistas de la enseñanza bilingüe. *Revista Fuentes, 23*(1), 27-40. https://doi.org/10.12795/revistafuentes.2021.v23.i1.11572

Zollman, A. (2012). Learning for STEM literacy: STEM literacy for learning. *School Science and Mathematics*, *112*(1), 12-19.

Conflicto de intereses
La autora declara no tener ningún conflicto de intereses.

Contribución de autores
Louisa Mortimore, 100%

Revista de Estilos de Aprendizaje / Journal of Learning Styles, Volumen 17, Nº 33, 24-36.
ISSN: 1988-8996 / ISSN: 2332-8533
www.revistaestilosdeaprendizaje.com

36