Exploring the impact of a teacher development programme using a digital application on linguistic interactions in the classroom: a multiple case study[1]

Abstract

This article reports on the use of a digital application (EVALOE-SSD) for the professional development of teachers to improve the linguistic competence of their students. We conducted a multiple case study that involved five teachers and their students from different schools. Over a period of three months, the teachers used the digital application to assess their classes, make decisions and introduce changes in their teaching practices. The results show that the change process includes stages of progress and stages of regression, but in general the trend was to a progressive increase in scores. Therefore, the use of the digital application improved the competences of teachers and students, regardless of the type of school or students' age. This is shown in the cases of two teachers, which are analysed in greater depth. We believe that our findings are important as they document how self-reflection, stimulated by aids such as video recordings, reflective questions and pictures, facilitates a change in teaching practices. At the end of the programme, all the teachers stated that the experience of using the digital tool had clearly been enriching, and they had learnt and improved teaching practice linked to communicative competence.

Keywords: self-assessment, linguistic competence, teacher development programme, digital application, classroom interactions

1. Introduction

Most studies on the use of digital media in education and the professional development of teachers have focused on educational applications. Information and communications technology (ICT) can provide innovative resources for teaching and for students' learning processes (Baser et al., 2016; Koh, 2019). Few studies have examined the use of ICT by teachers to reflect on their own teaching practices and how to improve them. The present study analysed the use of a digital application (EVALOE-SSD, *Escala de Valoración de*

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la Lengua Oral en contexto Escolar – Sistema de Soporte a la toma de Decisiones -oral language assessment in school context scale -support system device) as a teacher development programme to improve students' linguistic competence (Gràcia et al., 2020).

2. Literature review

Development of student's oral language skills

Sociohistorical, socio-interactional and ecological approaches to development all emphasise the importance of context and social interactions in children for their overall and language development (Sfard, 2008; Tomasello, 2003). Children build communicative and linguistic competence in natural contexts with the help of adults, using oral language in relevant situations with support and guidance (Gràcia et al., 2012). Schools are microcosms of interpersonal relationships that can favour communicative and linguistic development through quality linguistic interactions (Hamre, Hatfield, Pianta, & Jamil, 2014; Howes et al., 2008) and by teachers using certain educational strategies (Gràcia et al., 2017; Dickinson et al., 2008; Jones, 2017; Marinac et al., 2008). These dialogic processes foster learning (Clarke et al., 2016; Mercer, 2010). As Sedova (2017) stated, the "dialogic approach in a classroom occurs when various speakers respond to each other, when they support others' ideas, criticise them, or even get into conflict over them. The goal is to lay out various positions, with knowledge understood not as given but as gradually constructed in interaction" (p. 279).

Research indicates that the development of children's oral/spoken language competences has a significant impact on cognitive, social, and emotional development (Whitebread et al., 2013). However, oracy has unfortunately been the "poor relation" of literacy and numeracy, and is paid much less, if any, explicit attention in schools in most countries (Mercer et al., 2020; Millard & Menzies, 2016).

Various studies have revealed inconsistencies between students' beliefs about language and linguistic actions and teachers' conceptualisation of oracy and its assessment in schools (Mercer et al., 2017). To summarise, teachers need to expand their knowledge on teaching practices in relation to oracy and interactions during initial teaching training (ITT) and professional development (PD) to help them make appropriate decisions and improvements. Research studies developed in different countries have clearly revealed that commonly used teaching practices are quite distant from an ideal of dialogic teaching (see, for example, Burns & Myhil, 2004; Kumpulainen

& Lipponen, 2010; Nystrand et al., 1997; Parker & Hurry, 2007; Sedova et al., 2014).

Research indicates that some teachers and schools believe oracy always needs to be taught discretely. Others believe that oracy needs to be taught embedded throughout the curriculum and at kindergarten and primary level. Since class teachers work with the same pupils every day, it should be seen simply as part of day-to-day practice (Millard & Menzies, 2016). Teaching oracy discretely and embedding it throughout the curriculum may not be mutually exclusive. Oral skills should be developed in contexts that foster interaction and dialogue. However, this is insufficiently fulfilled in daily teaching practices. Gràcia et al. (2017) observed that the most common classroom activities are oral presentations and debates. They highlighted the limitations of various approaches as well as the need to plan and systematise oracy teaching-learning objectives in schools.

The need to assess linguistic competence to improve language development has led to the construction of a range of tools. However, very few tools focus on teacher-learner interactions (Harms et al., 1998; Marshall & Lewis, 2014). Different authors have used indicators to assess whether dialogic teaching is present (see, for example, Applebee et al., 2003; Molinari & Mameli, 2013; Molinari & Mameli, 2015; Myhill & Warren, 2005; Nystrand et al., 1997; Nystrand et al., 2001; Pimentel & McNeill, 2013; Sedova, 2017; Sotter et al., 2008).

Gràcia et al. (2015a, 2015b, 2021) developed a tool for assessing oral language teaching and learning in the classroom, the EVALOE-SSD, based on a sociopragmatic and ecofunctional perspective of language acquisition. The EVALOE-SSD is based on the principles of the conversational method and dialogic teaching. Classrooms are conceptualised as communicative spaces where oral language is reflected upon and taught, constituting a key tool in the learning of contents in all areas of the curriculum (Gràcia et al.., 2015b; 2017; 2019; 2020a, 2021). The tool was constructed on the basis that there is a strong link between talk time and students' achievement and that students in talkative classrooms had better results, regardless of socio-economic background or gender (Sedova et al., 2019). The aim is to offer teachers and other professionals (e.g., speech therapists and educational psychologists) a tool that enables them not only to evaluate teachers' skills and strategies for fostering communicative competence in the classroom, but also to assess the interactions between the teacher and learner and their linguistic actions.

The EVALOE-SSD consists of two parts. The first part is an observation scale based on 30 items grouped into three dimensions (Context and Management of Communication,

Instructional Design, and Strategies and Communicative Functions) with three response options (1, 2, 3). The second part is a series of questions that guide semi-structured interviews with the teachers to thoroughly evaluate their practices (Gràcia et al., 2015a, 2015b; 2020b).

Teacher development programmes and the use of digital tools

Teacher development (PD) can be defined as the professional growth a teacher achieves through gaining increased experience and examining their own teaching practices systematically (Glatthorn, 1995; Prieto et al., 2017). It is one of the main strategies for improving student learning (Villegas-Reimers, 2003). Several studies strongly advocate the use of 'collaborative coaching' between advisors and teachers to enhance their PD and performance in school (Docking, 2000; Veenman, 1995; Veenman et al., 1998). In this coaching model, the coach and the teacher(s) work collaboratively to address problems in teaching practices (Bean et al., 2010; Neufeld & Roper, 2003). Effective coaches can develop teachers' knowledge of relevant and effective instructional strategies, which helps the teachers to introduce these new strategies into their daily teaching practices through repeated cycles of demonstration, observation and feedback (Bean et al., 2010; Neufeld & Roper, 2003; Walpole & McKenna, 2012).

Recent findings have shown that the transfer of academic concepts into actual practice has been problematic (Girvan et al., 2016). As Smagorinsky, Shelton, and Moore (2015) state, teacher education usually results in a teacher adopting certain knowledge, but only rarely leads to a change in his or her way of teaching. Reflection is important here because it can serve as a connection point between the teacher's knowledge and his or her actions (Sedova, 2017). It enables teachers to evaluate their own practice in the process of change. A teacher can self-reflect about newly appearing patterns of behaviour, think them through and experiment with them (Berson et al., 2015).

Many technological tools have been developed to provide teachers with feedback on their own practices and to stimulate self-reflection (Romano & Schwartz, 2005) in collaborative coaching. They have progressively replaced some of the responsibilities of coaches. Digital media is a fundamental resource in ITT and PD. Some studies have investigated the use of digital media in ITT (Fainholc et al., 2013; Hughes et al., 2016; Paredes et al., 2015). However, much of this research has focused on the competencies required in teacher training so that teachers can become technology users (Koh, 2019; Uerz et al., 2018) and achieve professional digital competence (Gewerc & Montero, 2015;

Instefjord & Munthe, 2017). Some studies have evaluated uses of technology that help teachers to reflect on their teaching practices and make possible improvements (Könings, & Gijselaers, 2015; Mosley-Wetzel et al., 2017; Prieto et al., 2017; Reid et al., 2015; Romano & Schwartz, 2005).

Regarding the development of linguistic and communicative competences by teachers during their ITT and PD, various studies have explored the uses of educational technology to improve linguistic competence. These studies have focused on the context of online language learning (Ernest et al., 2013; Gruba, 2004), learning foreign languages (Golonka et al., 2014; Jeong, 2017; Quintana-Lara, 2014; Shield & Kukulska-Hulme, 2006), learning and communicating in content and language integrated learning (CLIL) settings for lifelong learning (Felip & Estebanell, 2016), encouraging reflections on the daily and academic use of scientific vocabulary in training (Kreps-Frisch et al., 2017), and teaching technology and digital literacies (Pasternak et al., 2016; Smythe & Neufeld, 2010).

Many research-based publications have focused on computer-assisted language learning because this requires new teaching approaches and skills that are different from those used in teaching face-to-face language courses (Hampel & Sticker, 2005; Mercer et al., 2017) and other subjects online (Compton, 2009). With respect to teacher's development for using digital media and computer-assisted language learning, there is an established body of work, including formal and informal learning (Cutrim Schmeid, 2017; Hubbard & Levy, 2006; Son, 2018; Son & Windeatt, 2017; Torsani, 2016). See Son (2018) for an extended overview.

In other words, most studies address the use of technology by or with students. However, they do not consider its use in helping teachers to self-reflect and improve their own skills and strategies to promote the development of linguistic competence in their students through linguistic and non-linguistic content. In general, the studies reviewed focus on the use of digital technology to teach first or second language to students, through platforms that encourage them to carry out exercises using the computer such as games, videos, and simulations related to written or oral language, which are often particularly motivating for students. The work of Compton (2009) is a good example of research into the needs of training for language teachers, in order to equip time to use specific strategies for teaching face-to-face and online. However, the focus of that study and other similar studies and the reflections of the authors is not the technology to help teachers to reflect on how to promote oral competence in face-to-face normal classes.

That is to say, the aim is not to design flexible and open intelligent pedagogical instruments that help teachers to reflect on their practice, evaluate their classes, make decisions and improve their own skills and strategies to promote the development of linguistic competence in their students through tasks with linguistic and non-linguistic content.

The use of decision support systems (DSS) is a recent development that helps to define and clarify the most important decisions and their consequences (Arnott & Pervan, 2016). Recent research has highlighted their advantages and potential for professional development in teachers, such as in the planning of teaching and content learning processes (Kalay & Chen, 2002), in decision-making related to structural and organisational changes in school (Sadahiro & Sadahiro, 2012) and in the context of special education or virtual learning (Xu & Wang, 2006). However, to our knowledge, DSS has not been used to focus on making specific decisions about how to improve oral language teaching in class, that is, on making decisions regarding the strategies that can be used or introduced in class to help students develop their language competence.

3 Rationale for the current study

The studies mentioned above have highlighted the challenges of designing digital technology to help teachers make decisions and plan their practice. Walsh (2003) used SETT (Self-Evaluation of Teacher Talk) procedures, supported by reflection and dialogue, with the aim of understanding the interactional organisation of the L2 classroom. Specifically, the aim was to develop understanding and interactional competence in a small group of university EFL teachers. Although the perspective adopted is similar to ours, Walsh (2003) did not use digital technology; in addition, unlike our study, the focus was on the teaching and learning of an L2.

In a previous study (Gràcia et al., 2020), we analysed the process of change in teaching practices during a teacher development programme that was focused on the implementation of oral language teaching based on the use of a first version of the digital application and reflective interviews (Korthagen & Kessels, 1999; Korthagen et al., 2001). The digital application EVALOE-SSD was constructed for the professional development of teachers to enhance their students' oral linguistic competence and reasoning. We considered students' oral linguistic competence to encompass their ability

to express themselves orally in a coherent manner, taking into account the characteristics of different communication situations and the normative aspects of the language, as well as combining expressive linguistic and non-linguistic resources to interpret and produce messages with different communicative intentions and using speech as an instrument for learning and planning activities, in the mother tongue and in second languages. We also investigated any changes in the teaching practices of teachers who participated in the study and improvements in students' oral linguistic competence as a result of using the digital application.

The aim of this paper is to discuss a process of change in teaching practices during a teacher development programme using a digital application in an independent way, focused on the implementation of oral language teaching. Additionally, we analysed teachers' perceptions of their participation in the teacher development programme. To the researcher's knowledge, no studies have examined the impact of independent use of a digital application in a teacher development programme on teachers' skills in teaching oral language and on their students' oracy development. The current study adopts a dialogic approach to broaden our understanding of the impact of a teacher development programme using a digital application on children's oracy skills. The main research questions the study answered was: How does the process of a gradual change happen? The secondary research question the study answered was: What is the teacher's perception of their participation in the teacher development programme?

4 Method

4.1 Participants

The participating teachers were selected using the criteria of convenience and opportunity through "snowball sampling" (Ochoa, 2015). The sample, as show in Table 1, was made up of five teachers from Catalan schools of different types and the respective groups of students.

Insert Table 1

As Catalonia is a region with two official languages, all children learn two or more languages (Catalan, Spanish, English and others). Almost all families of students in

School 1 are from Morocco. This means that children are learning four languages. Some families of students in School 2 are from Latin America and their first language is Spanish. Other native families use Catalan as a family language and others are bilingual. Finally, most of the families of students in School 3 are native and use Catalan, Spanish or both as a family language.

4.2 Instruments

a. EVALOE-SSD

This section describes the digital application and how it is used. The teacher is sent a link to enter the application (Catalan, Spanish, English or Portuguese language). After logging in, the first screen presents different sections: *Tutorial*, *Answer Questionnaire* and *See Results*.

Insert Figure 1

The *Tutorial* is automatically launched to guide the teacher through the instrument. Once the teacher has gone through all the tutorial screens, the other two sections appear on the screen (*Answer Questionnaire* and *See Results*). The *Answer Questionnaire* window allows the teacher to answer the questionnaire, while the *See Results* window provides a summary of their answers.

When the teacher enters the *Answer Questionnaire* section, a series of pop-up screens appear that guide the teacher through the self-assessment and decision-making processes, as summarised in Figure 2.

Insert Figure 2

To begin the questionnaire, the icon in the lower right-hand corner should be clicked to open a window that requests information about the observed session (school, teacher, date, educational level, number of students and a field to enter a description of the self-assessed class session). This must be completed before the questionnaire can be answered.

The next pop-up window shows the following elements, from left to right and top to bottom: the number of the item over the total number of items in the questionnaire, the name of the dimension it belongs to, the title of the item, the symbol showing its level of complexity (three different shades of purple circles), the information icon, three coloured icon faces (green, orange and red) and a lower button labelled "*What can I do to introduce this action into my teaching practice?*" (See Figure 3).

Insert Figure 3

The 30 items are grouped into 5 dimensions: Instructional Design, Teacher's Management of Communication, Student's Management of Communication, Teacher's Strategies and Communicative Functions, and Student's Communicative Functions. Regarding complexity, the 30 items in the questionnaire are categorised into three levels: high complexity (6), average complexity (12) and low complexity (12). In terms of the target, 17 are linked to the actions and/or strategies of the teacher and students, 14 to the actions and/or strategies of the teacher only, and 9 to the actions of the students only. The teacher is expected to read the title of the item, identify the degree of complexity through the symbol provided, click on the information icon to read the description of the item, read the dimension containing the item, and click on the information icon next to the dimension to reconfirm the definition of this dimension. The following table is an example of the title of one of the items, its description, and the help text linked to it.

Insert Table 2

In addition, when a teacher clicks on the lower button, four icons highlighted in white appear to inform them about the types of help available (each item has four types of help available: text in the form of reflective questions, video, audio and image). The teacher can review the information on each screen. After that, the teacher selects an answer based on how closely their performance in the assessed class session matches one of the three options provided. The green emoji emoticon indicates that the teacher has introduced the action or strategy that is linked to the specific item in their classes, the orange emoji emoticon indicates that the action or strategy has been introduced only in part, and the red emoji emoticon face indicates that the action or strategy has not been introduced at all. After selecting the answer, a new item appears automatically, following the same

process as described previously.

Once the teacher has answered all the items, a summary of the answers is shown (See Figure 4). The summary contains three shades of purple (that represent the complexity of the item) and different coloured faces based on the teachers' answers. On the following screen, six items appear, generated by the application's algorithm. The teacher must choose three of the six items to introduce into their classes in the following week. If the teacher checks the summary table at another time, after their self-assessment and decision-making, the three items or actions that they have decided to introduce into their next class are indicated by stars.

Insert Figure 4

Based on the results obtained in validations of the previous version of the digital application (Gràcia et al., 2019, 2020), some restrictions have been introduced into the algorithm, the most important being: 1) the first questionnaire has 15 items and progressively more items appear until 30 are reached; 2) the system does not allow the highest rating to be assigned (green: 2) the first time an item is assessed; 3) the system does not allow an item to be evaluated unless the teacher has reviewed at least one of the four types of aid (text in the form of reflective questions, video, image and audio); 4) when an item has been assigned the colour green five consecutive times, the teacher may decide that it will not appear again.

To assume an inclusive approach, augmentative communication systems are incorporated into the descriptions of the items and in the help formats. Both the video and image formats of the available help include real examples of interactions between teachers and children using augmentative communication systems. For example, the arrangement of tables, chairs, students and/or teachers in a circle or a U shape allows visual contact among all the participants during the conversation. This layout also includes the positioning of the board and materials (such as folders, reference books, toys, notebooks, communication panels, digital communicators, voice devices or tablets) so that communication can be as effective and comfortable as possible for all participants. This arrangement of furniture, teachers, students, materials and resources helps students to progressively manage the conversation. Adjustments are made according to the characteristics of the intended context of application, for example, class sessions where a deaf teacher teaches Catalan Sign Language (LSC, *llengua de signes catalana*) to a small group of deaf students.

Finally, the digital application allows the teacher to review the information (for example, read the definition of each item, consult the dimensions to which they belong or see the tutorial) and the aids (for example, read slowly the reflective questions and think about their practice, watch one of the video sequences illustrating a strategy or review one of the illustrative vignettes of an item) whenever it seems appropriate, without the need to carry out a self-assessment.

b. Questionnaire to assess a teacher's perception of the training

This is a tool that assesses the perception of participating teachers using the DA during the training. The questionnaire consists of 56 questions, both open (17) and closed (39), which are divided into four parts.

The questions in the first part are focused on obtaining information about the DA itself. The second part evaluates the wording of each questionnaire item in terms of its clarity, suitability/relevance, importance and ease of choosing one of the three responses, and it is made up of a table where all the items of the DA appear. The third part is focused on decision making. Finally, in the fourth part, the questions are directed at the use of the tool and its assessment to improve professional practice.

4.3 Procedure

The data were collected over three months, from March to June (see Figure 5). The teachers carried out self-assessments of eight to ten class sessions. Subsequently, the participating teachers were asked to answer the assessment questionnaire, which was designed to collect their perceptions about participation in the teacher development programme.

Insert Figure 5

4.4 Data analyses

The data analysis was carried out using mixed methods (Bairagi, & Munot, 2019; Creswell, & Creswell, 2018). For the quantitative analysis, measures of central tendency were used that allowed, for example, the establishment and comparison of mean scores and standard deviation. To carry out the analysis, the particularities of the algorithm that is the basis of the digital application had to be considered. Therefore, methodological

decisions had to be made to account for: a) the progressive appearance of the items; b) when an item has been assigned a green colour five times consecutively, the teacher may decide that it will not appear again; c) the system does not allow an item to be evaluated without at least having reviewed one of the four types of aid.

For the assessment questionnaire answers and the descriptions of the class sessions introduced by the teacher for each self-assessment in the digital application, content analysis was used through a system of categories that is presented in Table 3. To ensure the consistency and coherence of the analysis and the results, a cross-review was applied by the team of researchers at different points in this process, and expert judgments were performed to validate the procedures. The index of inter-rater agreement was calculated (95.2%).

Insert Table 3

4.5 Ethical considerations

In addition to the review of methodology manuals, the guidelines proposed by the Singapore Statement on Research Integrity (2010) were followed to determine which ethical aspects to consider in the research process. Prior to data collection, participants were informed of the purposes of the research and that they had the right to withdraw at any stage of the trial. Consent was obtained from the participants before the start of the study.

5 RESULTS

The results are linked to the teachers' performance and their use of the digital application, and to perceptions associated with the use and improvements resulting from the self-evaluation of their classes.

In this section, we present the results linked to the professional development of the six teachers, who used the DA weekly (33%), almost weekly (33%) and almost biweekly (33%).

5.1 How does the process of gradual change happen?

Below the results related to the first research question are shown in relation to how the

process of a gradual change happens (see Table 4).

Insert Table 4

Table 4 shows that all teachers' scores for the items increased over time. This can be observed in the mean score and its increase as the sessions increased. A limit was reached in sessions 9 and 10, in which the mean score remained the same. Therefore, from a descriptive perspective, we can say that the use of EVALOE-SSD increased the score for items as the number of assessed sessions rose. We could also indicate that a limit of improvement was reached in sessions 9 and 10 when the scores remained stable.

In addition, this table illustrates that two teachers performed a total of eight assessments, one teacher performed nine and two performed ten. A certain upward trend was observed. In practically all cases, the mean scores were among those answered in green or orange. None of the teachers followed the same scoring pattern, that is, each made different progress, with the occasional regression. T1, T3, and T5 had the highest scores, while T2 and T4 had the lowest. Table 5 shows the results of the increase in the mean scores between the first evaluation and the last one.

Insert Table 5

Table 6 presents the results related to the teachers' scores according to the complexity of the items (high, medium or low).

Insert table 6

In general, there is a tendency for teachers to assign lower scores to high complexity items than to medium and low complexity, especially in the cases of T1 and T2. The medium complexity items obtain slightly higher scores than those of low complexity for practically all the teachers.

Figure 6 presents the results of the scores according to the dimension of the items.

Insert Figure 6

Figure 6 shows that the highest scores were for B and D dimensions, which refer to the teachers' actions. Dimension C had the lowest score and refers to management of the context and students' communication.

Regarding the teachers' descriptions of the sessions, Table 7 presents the results based on the category system that was developed.

Insert table 7

Table 7 presents the results of analysing the teachers' descriptions of class sessions. Most of the descriptions were superficial, and only some teachers gave detailed descriptions. There was a greater tendency to describe the session without referring to the subject and to name the activity, rather than to refer to the subject on which they were working. The development of the sessions was in some cases structured and rigid and in others flexible. There was a strong tendency to refer to the use of language and conversation in general, and not so much to specific aspects of oral language. Only one teacher referred to the objective associated with oral language, and only on one occasion. In descriptions of students' behaviour and the use of terminology related to the DA, not much reference was made to use of language and conversation in general or to specific aspects of oral language.

The case of Teacher 2 and 4: Mira and Kate

The following are the results associated with the first research question in relation to the gradual process of change during the teacher development programme with the use of digital application. In this case we focus on two of the teachers, Mira (primary education) and Kate (kindergarten), to examine some of the data obtained in greater depth.

Both teachers carried out ten self-assessments in a period of two and a half months. Therefore, they evaluated their classes at average time intervals of 8.9 days.

Insert Table 8

The detailed results of Mira's and Kate's self-assessments are presented in Table 8. An

increasing trend was observed during Mira's first seven self-assessments, followed by a slight decrease, and finally another slight decrease in the last session. In Kate's case a slight fall in the scores was observed in the fifth self-assessment, followed by an increase.

In the case of Mira, some items were never assigned the colour green, the highest rating, including items A1, A2, B1, C1, C2, D1, D2, D7, E1 and E7. The way in which the teacher evaluated items D7 (I teach to regulate action) and E7 (Students regulate the action of others) is especially noteworthy, since they are items of low complexity but were not assigned the colour green at any time. Both refer to the regulation of action by the teacher and the student body. Kate did not assign the colour green to the items A1, A3, A4, A5, A6, C1, C2, C3, D1, D2, D3, D4 or E1.

Some items were not assigned the colour red in any of the evaluations (A6, B6, D5, D6, D8, E2 and E3) by either teacher. These were mostly items of low complexity and included two of medium complexity. In addition, they included three of the four items that Mira and Kate decided not to include again because she had already scored them green in five consecutive evaluations.

Five items were assigned the colour green in five consecutive self-assessments, and after this both teachers decided to eliminate them. They coincided on items B3 ("I give pupils time to take their turn") and D6 ("I clarify the pupils' unclear sentences").

In the seventh evaluation, Mira assigned the green colour for the fifth consecutive time to two items (B5 and B6), which refer to teacher's management. In this case, Mira decided that item B6 ("I use shift management so that all students participate") should no longer appear. Regarding item B5 ("I adopt an active role of guidance and orientation during oral language activities"), Mira decided that it should continue to appear in the next evaluation. In the eighth self-evaluation, after assigning the colour green for the sixth consecutive time, Mira decided that the item should stop appearing.

Insert Figure 7

Figure 7 shows that both teachers obtained higher scores on dimension B (teacher management). In contrast, dimension C (pupil management) more frequently had lower scores: Mira obtained an average of 0.7 and Kate one of 0.9. In Kate's case there were fewer fluctuations, and the progression was more gradual, especially in dimensions A (instructional design) and B (teacher management).

In addition to the dimensions, the progress of the scores was also analysed according

to the complexity of the items. The results are shown in Tables 9 and 10.

Insert Table 9 and Table 10

In this case, trends were also observed. Both teachers assessed the medium complexity items in most evaluations with a higher score (1.3) than the high or low complexity items. In all evaluations, the highly complex items were assigned a lower score.

Hence, in terms of the complexity of the evaluated items, the scores obtained by Mira show a pattern of behaviour during the evaluated period, since they follow a sequence of scores that explains trends when using EVALOE-SSD.

In all cases, the sessions that were evaluated were described in a superficial style, that is, without much detail. In the case of Mira, in general, the assessments made almost no reference to the subject, but did mention the activity that was carried out. They almost always referred to the classroom layout, specifically to the organisation into groups.

Half of Mira's descriptions of students' behaviour referred to a specific aspect of oral language, and only one description referred to the use of oral language and conversation in general. In two of the descriptions of the final sessions, the teacher referred to the objective related to oral language that was established in the session. An example is given in the following descriptions of class sessions:

"In written expression, the class group has been divided into six groups. The instructional text has been worked on in each group. First orally and then in writing."
"The classroom has been divided into 4 groups. The activity consists of elaborating a text together, aloud and using 4 drawings. The verb tense was decided by each group."

In Kate's case, in all the descriptions she referred to the theme that she would work on in her classes, rather than on the structure or activities.

"At the start of the month of April, we talked about who had a birthday this month and also about San Jordi" (23 April, St George's Day, an important celebration in Catalonia)
"We talk about Yayoi again, about how we are doing work like hers. We talked about how she draws polka dots all day and if they think it is tiring drawing dots all the time."

5.2 Teachers' perceptions of their participation in the training

This section describes the results of the second research question on teachers' perceptions of their participation in the training.

The analysis of the teachers' answers in the questionnaire at the end of the training indicates that 80% considered that the experience of using the tool has clearly been enriching and they had learnt and improved their teaching practice linked to communicative competence. The same percentage of teachers indicated that it took between 15 and 30 minutes to answer the questionnaire. All the teachers stated that they answered the questionnaire without pauses. Regarding the difficulty of finding time to evaluate a weekly class, 60% of the teachers considered that it was easy to find time to answer the questionnaire during the week. Only one teacher considered that finding this time was difficult in general.

The teachers considered that the three options that were presented to them were pertinent or quite pertinent. In the same way, all teachers considered that all types of aids were either useful or very useful. They stated that the most useful aids were those in video format; in second and third place were those in written format (reflection questions) and those in image format.

All the teachers considered that the DA was easy to use as an instrument, to learn or review the information it includes. In addition, all teachers considered that the DA was useful or very useful as a tool to learn or review the information it includes. All teachers considered that showing the levels of difficulty of the items was useful or very useful. Finally, all teachers considered that choosing one of the three types of response was easy for them.

The case of Teacher 2 and 4: Mira and Kate

Regarding the second research question and focusing specifically on the case of the teachers Mira and Kate, a relevant aspect is the way the items and dimensions were written, which according to Mira made it difficult for her to understand, use and benefit from the tool. She also mentioned the usefulness of aids to promote reflection on the use of oral language and conversation in general. She stated that *"These aids have been very good for me to understand each item well and to try to evaluate it correctly, since at the*

beginning of using the tool it was difficult for me to understand and apply some of the items". She also referred to the method of answering the questionnaire in a row, and the fact that a green answer could not be given the first time she evaluated an item. She explained that this was not a problem, but allowed her to reflect on her teaching practice.

Kate highlighted the importance of the aids for understanding the items. She explained that first she checked the text aids and if necessary, she then watched the videos or images. She said that the audio aids were not so necessary in her case, since the other types of help were enough for her given the way she used the tool. She said that in general the application was easy to use, very intuitive. However, what she found difficult was finding time to carry out the weekly self-assessment.

Both teachers said it was easy for them to choose an answer to the items (green, orange or red emoji emoticons). Both noted that the functioning and the use of the application was easy and that it was a useful instrument for obtaining information on the teaching and learning of oral language, on the dimensions in which the items are grouped, on their description, and the different aids linked to each item. They saw the application as *"A professional development tool to self-assess, make decisions and improve teaching practice in general, and skills related to teaching oral language in particular"*. Regarding decision-making, they considered that the six options that the DA proposed for selection were relevant, and made decision-making easy.

Finally, Mira and Kate had no problem with the absence of a green option the first time they responded to an item and they believed that it was useful for the items to appear progressively as they made the self-assessments, that is, that the first version only has 15 items, and the number of items increases to 30 depending on the assessments you make. Finally, they stated that the DA seemed very useful for their professional practice in relation to the teaching of different subjects at the educational level in which they worked, kindergarten (4-5 years old), and the final year of primary education (11-12 years old) respectively.

Discussion

The present study investigated the impact of a teacher development programme using a digital application so that teachers could assess linguistic interactions in the classroom, and teachers' perceptions of their participation in the programme could be analysed.

Many studies have focused on the use of educational technology to improve digital skills (Foulger et al., 2017; Koh, 2019; Ottestad et al., 2014; Uerz et al., 2018) and oral competence in the context of online language learning (Hopkins, 2013) and foreign language learning (Golonka et al., 2014; Jeong, 2017; Quintana-Lara, 2014; Shield & Kukulska-Hulme, 2006). However, the EVALOE-SSD aims to help teachers improve their teaching practices embedded across the curriculum to foster children's oracy skills. The digital application includes items related to conversation management; the arrangement of furniture, students and materials; seeking information and clarification through questions, summarising, and actions carried out by students regarding their participation in conversations, among others (Gràcia et al., 2020). The items are close to other proposals of oracy assessment with similar indicators and dimensions (physical [body language], linguistic [register, structure and organisation of talk], cognitive, and social and emotional [managing interactions, turn-taking, listening actively and responding appropriately]) (Mercer et al., 2017). Although there are similarities between these two tools, there are some major differences: EVALOE-SSD is a digital application, the number of items is shorter so that it can be used weekly by the teacher as a reflective tool, and, most importantly, it has been designed to assess not only children's outcomes but the strategies that teachers use to foster them.

Thus, the instrument represents a resource for teachers to learn and to reflect on their concepts of teaching and learning, considering the students as learners who can absorb almost as much from their peers as from their teacher by engaging in dialogues and discussions and listening to different perspectives (Clarke et al., 2016; Mercer et al., 2017; Nami et al., 2016).

In our approach, students are considered active learners who are in the process of building their identity and can speak one or more languages. They use language to learn curricular contents and continue to learn their usual language(s). They are aware of how they use language, as well as the strategies they are acquiring, which leads them to reflect on various aspects. The same applies to the teachers. EVALOE-SSD can help them to develop their identity as innovative teachers who reflect, raise questions, make decisions, and attempt to change their expectations of the students and trainees they support in a formal environment that is increasingly influenced by other contexts and is less clearly delimited (Gràcia et al., 2020; Mercer et al., 2020; Romero et al., 2014).

EVALOE-SSD is an application that allows teachers to self-assess their practice using the information (explanations of the items and aids provided in different formats)

so that they can make useful decisions and introduce changes into their classes by considering the characteristics of their students and the way they communicate (e.g., by oral language, augmentative systems or sign language).

In the present study, the instrument was used by the teachers as expected. All teachers performed assessments weekly or fortnightly, producing final scores that were higher than their initial scores. This indicates that the digital application was useful in improving teachers' skills. In addition, teachers made decisions at the end of each assessment, choosing three specific actions to perform in their next class. The results are in line with those found in other studies using a previous version of the digital application (Gràcia et al., 2020a, 2020b). In that study, researchers also used the tool and assessed four of the teachers' class sessions. Their final scores were also higher than their initial scores.

The specific results found by Gràcia et al. (2020a, 2020b) suggest that the comprehension of the digital application was progressive. The fact that the teachers' scores were initially higher than those of the researcher indicated that their comprehension of the application was minimal at the beginning, but increased when the application was used weekly and the teachers' reflected on its use (Cartwright, 2011; Shön, 1987; Veenman et al., 2006), coped with problems, searched for solutions, met with the researcher, made decisions, observed students' responses and had informal conversations with colleagues. The similarity between the results of the teachers' self-assessment and the researcher's assessment at the end of the study period reflects the professional development of the teacher, which is the main aim of the digital application.

The results presented in this paper shows more autonomous use of the digital application by the teachers, whose scores generally increased gradually, with fluctuations such as those observed in the previous study (2020a, 2020b) or studies using reflective interviews as well (Sedova, 2017). As has already been mentioned, this instrument was developed as a flexible and intelligent digital resource to help teachers improve their teaching practice by adapting to the changes linked to the diversity of languages, the diverse ways of learning these languages, and the systems used to communicate.

The regular use of the instrument by the teachers who participated in our study indicated that the tool was perceived as useful in improving teaching practices (Wong et al., 2017).

In general, the teachers used the instrument in their own way, though most of them followed the guidelines. The teachers showed that they could use the digital application autonomously and they could make decisions considering the complexity of the items,

and the difficulty of introducing actions related to the items or associated objectives in the class and with students who still need more time and practice. The need for lifelong learning is evident but finding a way to reach teachers through technology constitutes a challenge for researchers and trainers. Teachers cannot be left out of the digital culture or mobile-centric society nor can they ignore the challenges posed by the massive digital infiltration into everyday life (González-Patiño & Esteban-Guitart, 2014; Meiring & Norman, 2013; Suárez-Guerrero et al., 2016). Unlike the authors who seem to affirm that teachers have little interest in technology or are digital immigrants (Selwyn, 2009), we feel that this research underlines the fact that in many cases they are not only interested in the digital world but also have good digital skills (see Dooly & Vallejo, 2019; Vallejo & Dooly, 2019).

The use of digital applications that include self-evaluations and decision-making for professional development seems to be a new research focus. The teachers' assessment of the possibility not only of deciding what actions (theirs or the students) they want to introduce into the classes but also whether or not they want the items to appear again are a clear reflection of their self-regulation skills and reflection on their own practice. Despite the fact that there is limited research on this approach, the use of similar methods for lesson study practice (Cerbin & Kopp, 2006; Nami et al., 2016) or teacher preparation courses on computer-assisted language learning justifies the use of self-assessment and decision-making for professional development in teachers.

The present study explored the use of a digital application for professional development in teachers and its impact on the characteristics of the classes and the communication and linguistic competences of their students. In line with previous studies (Gràcia et al., 2020a; 2020b; Nami et al., 2016), our results support much of the literature on professional development in teachers involved with computer-assisted language learning and mobile-assisted language learning (Xu & Wang, 2006). The results also provide new insight into the potential of digital applications for educating teachers involved with computer-assisted language learning. They further reinforce studies that consider digital technologies are increasingly present in our lives and should be exploited to improve the learning of foreign (Beltrán et al., 2013) and native languages.

The results indicate that the highly complex items are given the lowest scores. This confirms the suitability of the author's conceptualisation of grouping items according to level of complexity (Gràcia, 2018; Gràcia et al., 2019, 2020). Actions (of teachers of students) or strategies that are more complex are harder to introduce in the classroom.

This means that teachers are aware that their practice is still far from that proposed in the model that is the basis of the digital application and that they cannot incorporate these items in the classroom yet.

In general, the study shows a dynamic, non-linear process of change in the teaching practices of five teachers who participated in a teacher development programme focused on implementing practices to foster oracy development. All the teachers in our sample experienced non-linear development with stages of regression. This finding indicates that conversational methodology is a complex epistemic stance (Boyd & Markarian, 2011, 2015; Molinari et al., 2013) and effective change must happen at the level of several elements at the same time. The results are similar to those found by researchers implementing dialogic teaching that has many similarities to our approach (Billings & Fitzgerald, 2002; Emanuelsson & Sahlstrom, 2008; Lefstein, 2008). Some authors consider this an idealised method, and that is very difficult for teachers to implement dialogic teaching with all its attributes in everyday practice (Lefstein, 2010; Sedova, 2017; Sedova et al., 2014).

In the case of Mira and Kate, the two dimensions with the highest ratings referred to their actions (not their students' actions), probably because they had more control over their actions and they tried consciously to introduce these new strategies into their classroom.

An analysis of the descriptions of all teachers' sessions, and those of Mira and Kate in particular, showed that most of the descriptions were superficial, without too much detail or depth in aspects related to oral language. Despite referring to the use of oral language and conversation in general, the descriptions did not make many references to specific aspects of oral language, especially those related to the terminology included in the digital application. Teachers probably needed more time to better incorporate and reflect on the conceptual contents of EVALOE-SSD. In addition, the superficiality of the descriptions could be explained due to the time dedication that exists for reflection and training in teachers' working hours. The complexity of marking answers on a digital application is not the same as writing a description in your own words that incorporates elements that are part of the proposed method, and using the key concepts that are part of the proposal properly. The latter involves a much higher level of elaboration and appropriation of the method. In any case, the teachers themselves were the initiators of the changes. As Grossman, Smagorinsky, and Valencia (1999) and Sedova (2017) state, teachers entering development programmes do not acquire new pedagogical tools (digital or other), but rather they appropriate them. This means that they do not adopt them in a fixed form, but subject them to their own interpretation and creatively work them into

their own repertoire of existing knowledge and skills, according to the specific characteristics of the context. According to Grossman et al. (1999) and Sedova (2017), the results of professional development can vary from a total lack of adoption of new tools, to the imitation of some characteristics, to perfect mastery when the teacher understands the conceptual base and can use appropriate methods. The results obtained seem to stress that the specific characteristics of the intelligent and pedagogical digital resource used in this study (the recurrent reflection on their classes, active and interactive attitude, descriptions of their classes, making decisions…), had helped teachers to progressively understand the conceptual basis of the proposal and to appropriate the method for themselves.

The results linked to the second objective, that is, teachers' responses to the questionnaire on perceptions of their participation in teaching development, indicate that their participation is clearly perceived as enriching, and that they learnt and improved their teaching practice linked to communicative competence. The teachers show certain consensus on the ease of use of the tool, the use and usefulness of the aids, and the main objective of the tool, among other factors. Mira's and Kate's reflection that they could not score the items in green the first time is also noteworthy, since Mira mentioned that, despite the fact that on one occasion this was interpreted as a disadvantage, after reflection she realised that perhaps it was not as appropriate as she first thought to value these items in green. This indicates that this feature of the tool allows critical reflection on one's actions, to enhance reflection on practice with mentors (Heikkinen et al., 2018; Hudson, 2013). It is also noteworthy that Mira and Kate did not mention the absence of meetings with the researcher or trainer. It could be assumed that this was because they did not believe it was an essential element for the proper use of the application, and that the application could be used without problems autonomously, as is the case of digital instruments used for training (Rich & Hannafin, 2009; Xu & Wang, 2006). The fact that there was no expert or mentor does not mean that this tool is not comparable with other multi-level scaffolding (Abdurrahman et al., 2019) since in essence the digital application, through the types of aids, is designed as a scaffolding tool that allows teachers to make independent decisions in relation to the progressive need for less help. This does not mean that it cannot be used in addition to a process in which an expert or mentor reflects jointly with the teacher. It is probably one of the uses of this tool, as was already achieved in initial versions (Gràcia et al., 2020a; 2020b).

6 Conclusions

It is probably impossible to avoid stages of disharmony in the process of such complex change, and it is therefore necessary for participant teachers to experience dissonance. Self-reflection about the aids included in the digital application played an important role in the development programme we carried out. They became a tool to introduce dissonance and to direct teachers towards experimentation and away from a return to their usual practices.

The aim of this study was to examine during a teacher development programme, the process of a gradual change in teaching practices towards conversational and dialogic teaching and the role that a digital application played in the process of the change. We showed that the process of change included stages of progress and regression.

We believe our findings to be important, as they document how self-reflection stimulated by aids such as video recordings, reflective questions and images facilitate a change in teaching practices. The belief that an experiential and reflective element is necessary in teacher development has been widely held in the academic community for some time (Beauchamp, 2015; Sedova, 2017).

As this case study demonstrates the use of self-reflection using a digital application and its effects, it contributes to the few studies based on empirical evidence of the actual use of reflective methods in teacher professional development (Mena et al., 2009, 2011; Sedova, 2017). We consider the most important contribution of our study is that it bridges the gap between theory and practice (Mercer & Howe, 2012) due to a design in which the researchers use the digital application to define the theoretical frame, offer new pedagogical tools through the digital application and support the teachers in experimenting with them. At the same time, the teacher is given sufficient freedom to autonomously look for ways to implement these tools, because a change in teaching practices is not possible without processes of appropriation and meta-appropriation (Sedova, 2017).

Results of the research show that teachers are prepared to abandon a learning process based on the lecture method, in which the teacher dominates the conversation while students are forced to sit, listen and take notes (Abdurrahman et al., 2019; Hartinah et al., 2020). Teachers are prepared to focus on creating new experiences for students (Diani et al., 2019) and to design and enact language-oriented lessons (Smit et al., 2018). Through this experience, students can develop their oracy skills and their knowledge.

Although causal claims are hard to underpin in such adaptive programmes without control groups, we consider that the progress made by the teachers was instigated through our interventions with the digital application. For example, teachers increased the number of items linked to language promotion strategies. Given the characteristics of their steps forward, for example with the items in dimension D (Communication functions and teaching strategies) that showed the greatest comparative increase, it seems very unlikely that they would have taken these steps without the support of the digital application. It seems that reflecting on lesson preparation in terms of content and language learning objectives in combination with hands-on experimentation and viewing of videos and other aids is a useful learning activity (Smit et al., 2018). Designing your own lessons can contribute to ownership and therefore be a condition for innovative practices.

The research was limited by the fact that we monitored ongoing change over three months and we cannot predict how much of this change would be maintained in the future. The collection of data from an entire school year is a challenge for future research studies.

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