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Fostering language awareness for integration through teacher-researcher collaboration in a Spanish bilingual education context

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ABSTRACT

Research on Content and Language Integrated Learning (CLIL) programmes has shown that teachers find it difficult to integrate content and language in their teaching, and that this may be due to a lack of a specific type of teacher language awareness (TLA) for this type of teaching. This study explores how TLA for CLIL is manifested in metatalk in the context of a collaborative professional development activity, which took place in a bilingual secondary school in Madrid (Spain). Content and language teachers in pairs designed content and language integrated instructional sequences, implemented them, and assessed the students' output. Four sessions in which teachers reflected on the activity, in collaboration with researchers, were audio recorded, transcribed, and analyzed. The data were analyzed using a social realist framework for investigating knowledge-building practices, Legitimation Code Theory (LCT). The analysis showed how content and language teachers refer to three types of knowledge (content, language, and language and content integration) in terms of 'what' is known (conceptual frameworks) and 'how' it is approached (following specific methods). The results confirm the importance of developing CLIL teachers' language awareness through on-site collaboration which is closely linked to their normal teaching activities.

RESUMEN

La investigación sobre los programas de Aprendizaje Integrado de Contenidos y Lenguas (AICLE) ha mostrado que los profesores tienen dificultades para integrar el contenido y la lengua en sus prácticas docentes, y que esto puede deberse a la falta de conciencia lingüística del profesor para este tipo de enseñanza. Este estudio explora cómo se manifiesta la conciencia lingüística de los profesores en relación a AICLE en su metalenguaje, en el contexto de una actividad de desarrollo profesional colaborativo que tuvo lugar en un instituto de educación secundaria bilingüe en Madrid (España). Los profesores de contenido y lengua, organizados en parejas, diseñaron secuencias didácticas que integraban contenido y lengua, las implementaron y evaluaron la producción de los estudiantes. Se grabaron en audio cuatro sesiones en las que los profesores reflexionaron sobre la actividad, en colaboración con los investigadores de este estudio. Estas sesiones fueron posteriormente transcritas para su análisis. Los datos se analizaron utilizando un marco social realista para investigar las prácticas de construcción del

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conocimiento, la Teoría de Legitimation Code Theory (LCT). El análisis mostró cómo los profesores de contenido y lengua se refieren a tres tipos de conocimiento (contenido, lengua e integración de contenido y lengua) en términos de "qué" se sabe (marcos conceptuales) y "cómo" se aborda (siguiendo métodos específicos). Los resultados confirman la importancia de desarrollar la conciencia lingüística de los profesores de AICLE a través de colaboraciones *in situ* que estén estrechamente vinculadas a sus actividades docentes habituales.

SUMMARY

This study describes an on-site professional development seminar for a small group of content teachers and EFL teachers in a bilingual secondary school near Madrid. The aim of the seminar was to help teachers develop an integrated approach to language and disciplinary content in their areas. Discussions among the teachers during the seminar were recorded and analyzed for evidence of developing Teacher Language Awareness.

The three researchers, who work on content and language integrated learning (CLIL), provided input on Cognitive Discourse Functions (eg define, explain, evaluate, explore etc.) necessary for learning and the language required to express them, as well as on school genres, i.e. text structures through which knowledge in different subjects is created. With this base the English and content teachers collaborated to create learning activities which they implemented in class. These activities also triggered written production which the teachers evaluated using a Comparative Judgment platform, in which fast, intuitive evaluation of two texts presented on screen produces a ranking of the student texts. This provided material for discussion among the teachers on the criteria they had used in their decisions. Finally, the students themselves took part in a similar activity and discussed reasons for their own evaluations in class. Their judgments and reasons they gave for them were the focus of a final seminar.

The paper presents an analysis of the discussion in the seminars using Legitimation Code Theory, a sociological framework for distinguishing conceptions of knowledge in professional groups. Results showed how dialogue between content and language teachers on activities directly related to their practice provided opportunities for them to develop awareness of how language *makes* meaning in their subjects. More references to integrated content and language were found than to either separately. After putting the activities into practice, teachers referred more to the use of knowledge of their subjects than to theoretical knowledge in isolation. This was a satisfactory outcome of the seminar sessions.

Introduction

Many teachers around the world teach subjects such as history, science, and mathematics through the medium of a second/foreign/additional language. These programmes are known by different labels and acronyms, such as content-based instruction (CBI), one-way and dual immersion, bilingual education, and English Medium Instruction (EMI). The acronym CLIL (Content and Language Integrated Learning) can be seen as an umbrella term which covers methodological implications of most of these programme types (Cenoz et al., 2014;

Dalton-Puffer et al., 2014). Thus, rather than being the label for any specific type of pro-gramme, CLIL can refer to an overall approach which provides principles and practices for the integration of subject matter content learning and L2 (second, foreign) language devel-opment (Llinares, 2015; Morton & Llinares, 2017).

One distinction which cuts across all types of programmes is that between 'content-driven' or 'language-driven' approaches (Met, 1999), sometimes referred to respectively as 'hard' and 'soft' CLIL (e.g. Ball et al., 2015). In content-driven or hard approaches, there may be little attention given to any kind of integration, with the language which is the medium of instruc-tion simply seen as a vehicle for content learning. Teachers may see themselves as essentially responsible for content learning and may have little expertise or interest in working on their students' L2 development (see, for example, Cammarata & Tedick, 2012; Tan, 2011). Alternatively, in language-driven or soft approaches, the content may be incidental to the language learning goals, and teachers may well be language specialists whose main interest is the language curriculum they are delivering. In some contexts, teachers may perceive a 'tension' in their practices in which they are not sure whether or how much attention to give to content and/or language (Martínez & Domínguez, 2018). Such situations are not conducive to any principled integration of a content curriculum and specific language learning goals.

One reason why both content and language teachers may avoid integration in their ped-agogical practices is that they lack familiarity with and training in any of the existing frame-works for content and language integration. A number of different pedagogical models for the integration of content and language learning exist, such as the 4Cs framework and the Language Triptych (Coyle et al., 2010), the Sheltered Instruction Observation Protocol (SIOP) model (Echevarria et al., 2016), the Contextualization, Awareness, Practice, and Autonomy (CAPA) model (Tedick & Lyster, 2019), the pluriliteracies approach (Coyle & Meyer, 2021), the Content-Language-Literacy Integration framework (Cammarata, 2016), and different adap-tations of genre-based pedagogy to CLIL (Lin, 2016; Llinares et al., 2012). While it is useful for CLIL teachers to have a grounding in at least one of these models, it may be more realistic to start with more basic building blocks which link content learning objectives with their linguistic realizations. For this purpose, the construct of cognitive discourse functions (CDF), introduced by Dalton-Puffer (2013), where cognitive processes involved in content learning (such as defining or explaining) and their L2 discursive and linguistic realizations are iden-tified, can be a useful tool for helping both content and language teachers to see how curricular content and specific language learning objectives can be linked. One advantage of the CDF construct is its flexibility in that it can be combined with, or incorporated into, most of the frameworks mentioned above, for example with genre pedagogy as is done in this study.

Whether any specific programme is more or less language or content driven, or whichever framework for content and language integration is used, effective teaching requires a type of knowledge and awareness which goes beyond simply adding language knowledge to content knowledge (He & Lin, 2018). As Hu and Gao (2021) point out, teachers' pedagogical practices as they attempt to integrate content and language are highly dependent on their language awareness, that is, their explicit knowledge of and sensitivity to language and its properties, how it is implicated in disciplinary learning, and the opportunities and challenges it presents to learners. In content classrooms where students are English learners, teachers may have a greater or lesser propensity to adopt language-integrated pedagogy depending on their professional backgrounds. Kim and Park (2024) found that language teachers were

more likely to be attuned to the needs of English learners, and content (STEM) teachers were less willing to integrate language in their pedagogy. Not only is success in CLIL programmes dependent on individual teachers' knowledge and skills, but it also requires the willingness and ability to collaborate with other professionals from different disciplines, especially in contexts where content and language teachers have shared responsibility for their students' language development (Andrews & Lin, 2017; He & Lin, 2018; Lo, 2020).

This is the case in the context which is the focus of the study we report on here, a secondary school in Spain which participated in a bilingual education programme, in which English was both a subject on the school curriculum, and the medium of instruction for a range of other subjects, such as science, history and physical education. The study was carried out in the context of a professional learning intervention which aimed to increase content and language teachers' ability to plan, implement and assess content and language integrated instruction through interdisciplinary collaboration. The framework for integration used was that of cognitive discourse functions, combined with genre pedagogy, and the focus of the study is on how the teachers' awareness of language for content and language integration was manifested through reflective dialogue in the context of collaborative planning of instructional sequences, their implementation in the classroom and their assessment of students' outputs.

To allow the participating teachers to verbalize their understandings of criteria for content and language integration, we used the technique of comparative judgement, in which they were presented with pairs of samples of students' writing and asked to make a quick decision on which one was a better response to the task, without using a rubric or any other instrument with specific pre-determined criteria (see Jones & Davies, 2023 for an overview of comparative judgement). They were later invited to engage in dialogue about the criteria which seemed to underpin the rankings produced. The conceptual framework for investigating the teachers' knowledge and practices combines a psychological (individual) and social (sociological) focus. At the individual level, we draw on the literature on teacher language awareness (TLA), particularly work which has focused on CLIL teachers, and at the social level, we use Legitimation Code Theory (LCT), which is a social realist framework for investigating knowledge practices. In the following sections, we briefly outline the approaches to content and language integration which we used in the intervention (based on CDFs and genre pedagogy), before going on to describe our approach to TLA for CLIL, as an individual (psychological) phenomenon, and the application of LCT, as a sociological phenomenon in which knowledge itself shapes practices and dispositions.

Frameworks for content and language integration: cognitive discourse functions and genre pedagogy

As outlined in the introduction to this article, the fact that teachers may not integrate content and language in their pedagogical practices is not for lack of theoretical models. The problem is more likely to be that they, and/or those responsible for their training and professional development, may not be aware of these models. As we shall see a bit later in this article, there has been growing interest recently in conceptualizing TLA for CLIL. However, a prior step to working with CLIL teachers' language awareness is to consider what it is they need to be aware of. Any of the models mentioned above could provide an adequate grounding for integrating content and language as part of pedagogical practice. Which model is chosen

will often depend on the context, with frameworks such as SIOP and CAPA more adapted to North American mainstream education (SIOP) or immersion (CAPA). The 4Cs and Language Triptych model (Coyle et al., 2010) and the pluriliteracies framework (Coyle & Meyer, 2021), along with Llinares, Morton and Whittaker's (2012) sociocultural/genre approach, have emerged in European CLIL contexts. Another variant of genre pedagogy, notably the 'genre egg' and the multimodalities-entextualisation–cycle, have been developed in the Hong Kong context (Lin, 2016). Space does not allow us to explore these models in depth here but suffice it to say that each of them requires a considerable effort of mediation on the part of teacher educators for them to be applied by teachers in their planning, teaching, and assessment. As will be seen when we deal with dimensions of language awareness, it is a question of turning 'declarative' (theoretical, context-free) knowledge into 'procedural' (practical 'how to') knowledge.

As we briefly mentioned in the introduction, one framework which is rapidly gaining ground in studies of content and language integration is Dalton-Puffer's (2013) construct of cognitive discourse functions (CDFs). CDFs link common content-oriented learning objectives, often expressed as verbs such as *define*, *describe* or *explain* to the language needed to express them. The 'cognitive' dimension refers to the thinking processes that teachers of all subjects typically want their students to engage in, while the 'discourse' dimension acknowledges the fact that these operations must always be realized through language, sometimes in combination with other semiotic means. As can be imagined, across different subjects, the number and types of verbs used for these operations is huge, and often ambiguous and overlapping. Dalton-Puffer's taxonomy organizes and reduces the functions to a manageable number of seven categories (Table 1).

Within each category, there can be further members, each of which specifies an aspect of the function more narrowly. For example, the CDF DESCRIBE has the members *describe*, *label*, *identify*, *name*, and *specify*. CDFs can be seen as basic building blocks for knowledge construction, and they can combine or become integrated in longer texts to form genres. For example, the CDFs CATEGORIZE or DEFINE can appear along with DESCRIBE to build the genre of descriptive or classifying report (Rose & Martin, 2012, p. 128). Even though there is overlap in the terminology of CDFs and genres (e.g. description, report, explanation), it is clearer to see CDFs as more basic building blocks which rarely exceed sentence level, while genres refer to longer stretches of text which have developed to serve specific communicative purposes (Martin & Rose, 2008). As Morton (2020) argues, CDFs can serve as a bridge linking content, literacy, and language, and are an accessible framework for both content and language teachers in planning, classroom teaching, and assessment, as will be shown

Table 1. Cognitive discourse functions (Evnitskaya & Dalton-Puffer, 2023 adapted from Dalton-Puffer, 2013, p. 234).

Type	Communicative intention	Label
1	I tell you how we can cut up the world according to certain ideas	CATEGORIZE
2	I tell you about the extension of this object of specialist knowledge	DEFINE
3	I tell you details of what can be seen (also metaphorically)	DESCRIBE
4	I tell you what my position is vis a vis X	EVALUATE
5	I give you reasons for and tell you causes of X	EXPLAIN
6	I tell you something that is potential	EXPLORE
7	I tell you about something that is external to our immediate context on which I have a legitimate knowledge claim	REPORT

in the present study. Working with CDFs can also be seen as a stimulus to develop teachers' language awareness for CLIL, helping them to move from a conception of language forms in isolation from content, to see more clearly how language is implicated in knowledge-building in different subjects. We now turn to our conceptualization of TLA for CLIL.

TLA for CLIL

In recent years, there has been growing recognition that teachers in CLIL contexts (using CLIL broadly as an umbrella term) require a specific type of language knowledge or aware-ness, which is not the same as that required by language teachers (Andrews & Lin, 2017; Gierlinger et al., 2023; He & Lin, 2018; Hu & Gao, 2021; Lo, 2019; Morton, 2018; Peltoniemi & Bergroth, 2022; Seah et al., 2022; Xu & Harfitt, 2019). Although much of the research on CLIL teachers' language awareness draws on conceptual frameworks developed in language teaching, such as the three *user*, *analyst*, *teacher* dimensions (Edge, 1988; Wright, 2002), and Andrews's (2007) conceptualization of TLA as a component of pedagogical content knowl-edge (PCK), they develop these frameworks in ways which respect the complexity of content and language integration. For example, He and Lin (2018) draw on Andrews's TLA as a heu-ristic lens, seeing CLIL teachers' language knowledge as going beyond the simple addition of content knowledge and knowledge about language (KAL). They see TLA for CLIL as co-constructed through dialogue and embedded in teachers' contexts of practice. Ultimately, developing TLA for CLIL involves a transformation of identities, as teachers move from reflect-ing on how they use language, through developing the ability to analyze language, to becoming a teacher capable of integrating content and language in pedagogical practice.

Xu and Harfitt (2019) also draw on Andrews's (2007) framework in investigating the lan-guage awareness of two Grade 7 science teachers in a secondary school in Hong Kong. Andrews's model highlights three main aspects of TLA: teachers' own language proficiency (through which their instruction is mediated); their knowledge of the specialized language of subject matter (for language teachers this can be the language syllabus, for content teach-ers it can be the language of the subject and general 'academic' language); their knowledge of learners and the linguistic challenges for them in learning tasks and activities. Xu and Harfitt emphasize the third aspect, shifting the focus from teachers to learners. They argue that TLA underlies teachers' decisions about how to scaffold language learning, and their practices relating to language use in science classrooms (strategies such as mediation, prob-ing for expansion by asking questions to elicit higher order thinking, and translating). Focusing on teachers' pedagogical practices for scaffolding learning, they place an emphasis on the procedural dimension of TLA (not just 'knowing that', but 'knowing how'). Also in Hong Kong, Hu and Gao (2021) investigated the language awareness of four secondary teachers who taught mathematics and science through the medium of English. They high-light the need for content teachers to be able to incorporate more focus on language forms such as lexis, grammar, and discourse structure within genres, as well as language learning strategies, in their pedagogical practices. They argue that too little attention to language form in content teachers' pedagogical practices may be detrimental to content learning outcomes.

We highlight these studies because they exemplify the basic outlines of the approach to TLA for CLIL that we adopt in this study, at least how it is seen as an aspect of individual teacher cognition. That is, we draw on Edge's (1988) framework of the three dimensions of

user, *analyst* and *teacher*, seeing development in teachers' language awareness as a growing capacity to move from reflection on one's own language use (*user*), through developing knowledge of frameworks for analyzing language in the context of content teaching (*analyst*), to the ability to put this knowledge into practice in planning, instruction, and assessment (*teacher*). From Andrews's (2007) framework we highlight his focus on the declarative and procedural aspects of TLA. Andrews's argues there is a 'crucial distinction' between these two dimensions, with the declarative dimension referring to the teacher's possession of subject-matter knowledge, and the procedural dimension being seen as 'knowledge-in-action' (2007, p. 94). In this sense, Andrews distinguishes between 'knowledge' (the declarative aspect) and 'awareness' (procedural), with the latter enabling teachers to draw on their knowledge fluently, easily, and appropriately in the real tasks of teaching.

The other key aspect of the development of TLA as described in these studies is its collaborative nature. Andrews argues that TLA should be developed through 'a combination of language-related self- reflection and focused collaborative activity' (2007, p. 189). As mentioned above, this is particularly highlighted in He and Lin's (2018) study, where they identify 'knowing-in-action' and the idea of the 'reflective practitioner' as essential components in a framework for the development of TLA which they describe as a Collaborative, Dynamic, Dialogic Process (CDDP). Not only should the development of TLA for CLIL be a collaborative process, but it should also be embedded in the types of activities teachers normally engage in, such as planning, classroom instruction and assessment. As Bartels points out in the context of language teaching, teacher education activity targeted at the development of teachers' knowledge of language should be '…organized around activities typical of L2 instruction' (Bartels, 2009, p. 127). Lo (2020) discusses how CLIL teachers can benefit from two models of professional development (which would serve to enhance their TLA). Model 1 refers to school-based cross-curricular collaboration where CLIL teachers can receive continuous support on-site from L2 teachers, while Model 2 refers to the provision of short courses or workshops which can build a theoretical knowledge base for CLIL. Lo points out that, in her experience, CLIL teachers find training workshops too theoretical and boring, but that they generally respond well to on-site support. This points to the need to ensure that, if possible, professional development designed to increase teachers' TLA for CLIL must be both individual (reflective) and collaborative (dialogic), situated in the teachers' normal working environment (the school) and be sustained in time.

Legitimation code theory

As seen in all the studies reviewed above, teacher language awareness is a question of knowledge and knowledge practices. Indeed, there has been some terminological confusion in the field, as the terms 'Knowledge about Language' (KAL) and 'Language Awareness' are both used to refer to a similar construct, or set of constructs (Cenoz et al., 2017). However, the Association for Language Awareness (2023, July, 12) subsumes 'knowledge about language' in the broader construct of Language Awareness, which they define as 'explicit knowledge about language, and conscious perception and sensitivity in language learning, language teaching and language use' (Association for Language Awareness, 2023, July 12). Given that language awareness is concerned with knowledge, it is important to ask what role, if any, the knowledge itself plays in shaping teachers' dispositions and practices. For this, we draw on Legitimation Code Theory (LCT), a sociological framework

for exploring and enhancing knowledge practices (Maton, 2014). In this theory, knowledge is seen as something that is real in the world, and which has effects such as shaping actors' dispositions and practices. Maton argues that models of knowing such as Shulman's (1987) pedagogical content knowledge (PCK) are examples of the 'subjectivist doxa', in which knowledge is seen as either individuals' subjective states of consciousness or mental processes, or in more 'social' perspectives, such as communities of practice, as collective aggregates of these subjectivities. In these models, thus, the focus is on the knower and ways of knowing, rather than knowledge itself, or any of its properties. This can also be said about the way the concept of TLA has been used, especially as it draws on earlier concepts such as PCK. In other words, these models adopt a psychological perspective, with a focus on how knowledge is constructed by the individual, rather than on how knowledge itself shapes practice. We argue that both perspectives are necessary, and so we see TLA both from the perspective of practitioners' attributes as *users*, *analysts* and *teachers*, and also from the perspective of how knowledge shapes practice. It is precisely to address this second perspective (knowledge) that this study uses one dimension of LCT, Specialization, and within this dimension, the epistemic plane.

The LCT dimension of Specialization sees educational practices as knowledge/knower structures in which either, or both, the objects of knowledge (what is to be known) or knowers (who is acquiring the knowledge) can be emphasized as the basis of legitimacy for the practice. If knowledge is emphasized, epistemic relations (ER) are strengthened, and if knowers are emphasized, social relations (SR) are strengthened. If knowledge is emphasized, we can zoom in on epistemic relations, seeing them as having two basic orientations—ontic and discursive relations. Ontic relations (OR) highlight the 'what' of knowledge practices, the part of the world to which they are directed. Discursive relations (DR) relate to the 'how', to relations between knowledge and other knowledges, specifically in the ways in which knowledge can be approached. The variations in strengths of OR and DR (+, –) can be plotted as an epistemic plane which yields four 'insights' (Figure 1).

In the *situational insight* principles and concepts are emphasized, but no specific approach or method of dealing with them is identified. There is a greater emphasis on *what* is being studied, rather than *how*. This insight can be applied in knowledge practices where different
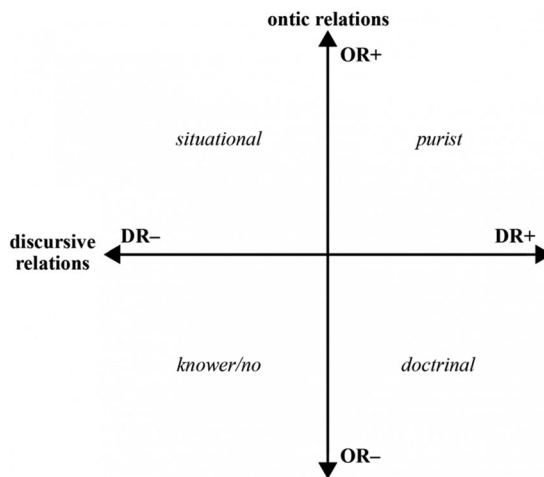

Figure 1. The epistemic plane (Maton, 2014, p. 177).

problems are addressed, but no one approach to them is specified. The *doctrinal insight* de-emphasizes specific objects of knowledge, but highlights approaches to working with knowledge. *What* matters less than *how*. This can be applied to knowledge practices where there is a strong focus on methods, approaches and procedures, and the principles underlying them, or the concepts they can be used to work on, are downplayed. When both principles and concepts, and ways of working with them are the focus, we have the *purist insight*. To be successful in this type of knowledge practice, one needs to know not only the relevant principles and concepts, but also the 'right' ways of working with them. If neither ontic nor discursive relations are important, this may indicate a relativist code where more or less anything goes, or a *knower code*, where attributes of the knower are highlighted.

Using the epistemic plane from LCT to investigate knowledge practices in CLIL enables a more rounded vision in which the declarative and procedural dimensions of language awareness (in a more subjectivist perspective) are mapped onto ontic and discursive relations, to reveal part of the underlying organizing principles of the practice. This enables to see more clearly how different orientations to knowledge have an effect on teachers' practices and their beliefs about what is desirable or possible. To bring 'what' is to be known into clearer perspective, we analyze teachers' knowledge in three domains: knowledge of subject-matter (non-language) content, such as science, history or physical education; knowledge of formal aspects of language from the EFL syllabus (grammar, lexis, mechanics such as punctuation or spelling); knowledge of content and language integration (how specific cognitive discourse functions are implicated in the expression of content knowledge). We then go on to analyze the strengths of ontic and discursive relations for each of these types of knowledge, in order to show how the different insights throw light on the development of the teachers' TLA as they move between the three domains of *user*, *analyst* and *teacher*, and between acquiring declarative knowledge and putting it into practice. We start from the assumption that 'metatalk' (Watson et al., 2021) can play a key role in facilitating transfer between declarative and procedural knowledge. That is, when teachers use a metalanguage to talk about content and language learning, and their integration, in the context of planning, describing and interpreting pedagogical practice, they create potential for developing a more 'integrative' language awareness, as they move through the domains of *user*, *analyst* and *teacher*. To guide the study, we formulated the following five research questions:

1. How much do participants in a CLIL professional development intervention (content teachers, language teachers, researchers/academic developers) refer to the three domains of content, language and content and language integration in their seminar talk?
2. Do content and language teachers differ in the amount of attention they give to these domains?
3. Are there any changes in the frequency of reference to these domains over the lifespan of the intervention? Particularly, is there evidence of a more integrated approach in later sessions?
4. What are the organizing principles underpinning teachers' practices in terms of relative strength of focus on 'what' (ontic relations) and 'how' (discursive relations) in each of the three domains?
5. Are there changes in the relative strengths of ontic relations (OR) and discursive relations (DR) in terms of integrativeness as the intervention progresses?

The study

The study was conducted in a secondary school in Madrid (Spain) which was participating in the region's bilingual education programme, in which up to 40% of the curriculum is taught through the medium of English. This programme reflects a strong drive for bilingual education in the Madrid region, with around 50% of state primary and secondary schools participating. At school level, there is usually a bilingual coordinator, who is responsible for the overall running of the bilingual programme, and for encouraging and promoting collaboration between staff involved in the programme (both content and English language teachers). The school was located in a predominantly middle-class suburb, just north-west of Madrid. The intervention took place as part of a larger national funded research project which aimed to longitudinally track the development of students' academic literacy in English in the content of the bilingual programme and teachers' assessment of their performance. The aim of the intervention was to introduce teachers to frameworks for the integration of content and language, such as CDFs, genre pedagogy, and the concept of *semantic wave* from LCT (Maton, 2020). CDFs would allow teachers to formulate content and language integrated learning objectives, genre theory would enable them to work with specific text types, and the concept of semantic wave was to help them to design instruction that moved between more abstract, conceptual material, and examples grounded in real-life contexts. The intervention was designed to explore the extent to which these constructs could be used to foster a more collaborative, interdisciplinary approach at the school level, particularly by getting pairs of content and language teachers to work together on planning, implementing, and assessing instruction. The intervention was designed and led by the three authors of the present study. In this sense, we are in the double role of participants in the intervention as professional developers, and as researchers investigating its possible effects on the teachers' TLA and practices. This calls for reflexivity and transparency in relating and assessing our own contribution to the intervention and its possible effects. Our main resource for achieving transparency is openness in subjecting our own contributions to the same analytic frameworks as those of the teacher participants.

Six teachers volunteered to take part in the intervention (four English teachers, one science teacher, and one physical education teacher). For the planning and implementation of content and language integrated instructional sequences, we formed two pairs (one science teacher with one English teacher, and one physical education teacher with one English teacher). The other two English teachers participated in the seminar discussions and in the assessment of students' output through comparative judgement. The pairs' task was to design an instructional sequence based on a topic from the content curriculum (science or physical education) and incorporate into the sequence specific language learning goals based on CDFs and genre. To a certain extent, this involved 'matching' the curricular goals for the subject with items from the English syllabus for the relevant grade level. However, the aim was to go beyond the matching of discrete linguistic features to include CDFs relevant to the content-learning goals, and to consider the genres or text-types the students would have to produce. Two instructional sequences were created: for grade 7 science, the sequence consisted in extending work on the water cycle into English by asking students to write a narrative of a day in the life of a water drop; for grade 7 physical education, the

teachers developed a sequence on traditional games in different countries, in which the students had to interview an older person about games they played, and then 'teach' a game to their classmates.

In the seminar sessions, the pairs shared their plans with the whole group (including three researchers from the project—the authors of this article). This allowed them to receive feedback before implementing the sequence with their classes. An important part of the design of the intervention was that the students would produce written work (in line with the focus of the larger funded project), and this work would be assessed by the participating teachers. The purpose of this assessment was not to grade the students' work (though it could be used to give them feedback), but to allow the teachers to articulate their own criteria for assessing the quality of the work (content, language, or more 'integrated' criteria). To do this, we used the technique of comparative judgement, and the tools available from the website of the organization No More Marking (No More Marking, 2023). Comparative judgement involves judges (teachers, in this case) looking at two student responses to a task on a computer screen and quickly deciding which is better by clicking. Although intuitively it may seem that deliberative reflection would be more reliable than on-the-spot decisions, empirical evidence suggests that quick pairwise comparisons produce a high level of assessment reliability (Jones & Davies, 2023). Over many judgements, the individual texts are ranked in terms of how often they 'won' each time they were compared, and the output is a ranking of the scripts which is claimed to be more reliable than that achieved by marking to a set of criteria, such as when a rubric is used (Pinot de Moira et al., 2022). The advantage of using comparative judgement for stimulating reflection and dialogue is that it elicits the teachers' already-existing criteria (which may be held at a tacit, unconscious level), but the resulting rankings gives them the opportunity to verbalize their criteria and enter into reflective dialogue with colleagues. As part of the input (in the first two sessions) included conceptual frameworks such as CDFs and genre, it also allowed for the emergence of 'metatalk' (Watson et al., 2021), providing evidence for possible transfer of declarative to procedural knowledge.

Data collection

The main dataset used in the study is the audio recordings of four of the five seminar sessions held at the school between November 2021 and April 2022. In the first session (2 November 2021), the teachers were briefly introduced to the construct of CDFs, and then were asked to consider their practical application in a model task for chemistry, which had been designed by another group of teachers the previous year. This was to allow them to start thinking about the process of designing their own unit in pairs. This session was not recorded as it was mostly input and was not designed to elicit reflective metatalk. The second session (30 November 2021) was taken up with the presentations by the teachers of the various tasks designed for the two subjects, science and physical education: the water cycle, and traditional games, and discussions around the CDFs and the genres (purpose, structure, language features) involved. In this session, they were able to obtain feedback from peers and the researchers and engage in reflective dialogue about the proposed activities.

In session 3 (25 January 2022) the teachers discussed written and spoken samples from student work which they had collected during the implementation of their activities. The

construct of genre was applied to contrast factual text (sequential explanation) and narrative (narration) from the activities designed around the water cycle. The concept of semantic wave was also used to consider how the instructional sequences moved between more decontextualized complex meanings and less complex meanings embedded in specific situations, such as when students are given practical examples. In preparation for session 4 (21 February), the teachers had carried out comparative judgement (as described above— quick pairwise judgements) on texts written by students as part of the designed activities on the water cycle and traditional games. In the session, the teachers and researchers engaged in reflective dialogue on the criteria which had been applied in ranking the texts. The final session was held on 19 April 2022 (the March session had been postponed), and for this session, the teachers had asked students in their classes to carry out comparative judgement on selected texts. The discussion here focused on the criteria the students had used and how they were similar or different to those used by the teachers. The entire dataset consisted of 6 h and 40 min of recorded talk (just under 60,000 words when transcribed).

Data analysis

The analysis was carried out using the text annotation software UAM CorpusTool (O'Donnell, 2021). We created coding schemes to analyze the focus of the talk (content, language, content and language integration, hereafter CLI). The units of analysis depended on the focus of the talk, so that, for example, if a teacher was referring to science content, we maintained the coding 'content' until the topic changed. We coded as 'language' instances of talk where the focus was on isolated linguistic features (e.g. grammar or lexis) without linking them to any aspect of the content learning. We coded as content and language integration utterances and stretches of talk where constructs introduced in the seminar, such as CDFs, genre or semantic waves, were used in ways which explicitly linked language production to content learning. We were sensitive to different strengths of integration as we analyzed the data, noting that sometimes content and language were simply juxtaposed, sometimes the language was task-related, and sometimes there was deeper integration in terms of disciplinary meaning-making. We took note of these distinctions for subsequent analysis and discussion. In carrying out the epistemic plane analysis, we labelled all the coded stretches for their relative strengths of ontic and discursive relations (OR+/−, DR+/). To do this, we created a 'translation device' (Maton & Chen, 2016), which linked the categories emerging in the data to the LCT concepts of ontic and discursive relations and the four insights (Table 2).

The coding was carried out concurrently by two of the authors and any differences were resolved by referring to the translation device. Once coding was complete, we used the 'statistics' function of CorpusTool to identify frequencies of the coded features in the data, thus addressing the five research questions.

Results

We present the results relating to each of the five research questions, to show how the three types of knowledge (content, language and content and language integration) were objects of attention in the seminar talk according to types of participants, and how they were oriented to in terms of epistemic relations. The percentages in the tables refer to the distribution

Table 2. Translation device for epistemic plane analysis of content, language and content and language integration in seminar talk.

LCT epistemic plane	Indicator	Example from data
OR+/DR− (Situational insight)	Specific objects of knowledge (content, language or language and content integration) are emphasized but ways of working with them are not.	Content: *they knew what was happening in (.) precipitation or: evaporation* Language: *And we do question structures. The main items that have been covering between September and now.* CLI: *Describing now is exploring and evaluating because they give their opinion.*
OR+/DR+ (Purist insight)	Both specific objects of knowledge (content, language or language and content integration) and ways of working with them are emphasized.	Content: *So the rules are, (are) followed but, as you said, I think this is not the result of an interview.* Language: *So, they will have to use the past tenses in a narrative text.* CLI: *We are going to use is, for example describe, describing, describe the water cycle, and they have to write a report about how the water changes in our planet.*[1]
OR−/DR+ (Doctrinal insight)	Specific objects of knowledge (content, language or language and content integration) are not emphasized but ways of working are emphasized.	Content: *In the laboratory we are going to make some experiments.* Language: *Not the grammar, but creativity is important.* CLI: *Because it's very important that the students speak English in Biology.*
OR−/DR− (Knower/no insight)	Neither specific objects of knowledge (content, language or language and content integration) nor ways of working are emphasized.	No examples in the data.

Table 3. Participants' reference to content, language or language and content integration.

Knowledge focus	Content teacher		Language teacher		Researcher	
	N	%	N	%	N	%
Content	94	39.5	54	19.7	49	11.6
Language	28	11.8	73	26.6	61	14.4
Content and language integration (CLI)	116	48.7	147	53.6	313	74.0
Total	238	100.0%	274	100.0%	423	100.0%

of the features of interest, i.e. what proportion of all the features coded in a specific category each individual type accounted for.

For research questions 1 and 2, we show the frequency with which each type of participant (content teacher, language teacher, researcher) referred to content, language and content and language integration (Table 3).

For all three types of participants, CLI was the aspect of knowledge most referred to in the seminar talk. This was probably not unexpected as content and language integration was the focus of the seminar, and in this sense, it can be seen as encouraging from the point of view of the development of TLA for CLIL. The highest percentage of attention to CLI was seen in the researchers' talk (74%), but interestingly both the content and language teachers devoted around 50% of their attention to this type of knowledge. As expected, the content teachers focused more on content than on language and the reverse was the case for language teachers, though these paid more attention than the content teachers to the 'other' type of knowledge.

Table 4. Participants' reference to content, language or content and language integration over the four sessions.

Knowledge focus	Session 2		Session 3		Session 4		Session 5	
	N	%	N	%	N	%	N	%
Content	107	23.5	14	7.1	83	36.9	21	10.0
Language	52	11.4	28	14.3	67	29.8	40	19.0
Content and language integration (CLI)	296	65.1	154	78.6	75	33.3	149	71.0
Total	455	100.0%	196	100.0%	225	100.0%	210	100.0%

In addressing research question 3, we looked at the frequencies of reference to the three types of knowledge over the four recorded sessions, looking for changes over the time of the intervention (Table 4).

In sessions 2 and 3 there was a high frequency of reference to CLI, as expected, as these sessions focused on CDFs and LCT (Semantics), respectively. In the third session, where the focus was on the results of the teachers' judgments of their students' texts, the distribution across the 3 foci was more balanced. This contrasts with the final session, where students' judgments were discussed, where again the focus on CLI is much higher than on content and language separately.

In order to delve deeper into the results regarding any changes in focus over the sessions, we look at the results for content and language teachers separately (Tables 5 and 6).

Content teachers' reference to CLI aligns with the general results in that it represents the most frequent focus in all the sessions except for session 4. Overall, as the sessions progressed, they kept a steady focus on CLI first, followed by content, and with language always lagging in third place. Session 4, in which participants discussed rankings of students' work, brought content to the fore for them, which may be understandable as they were discussing the criteria they used in judging their students' texts. However, by session 5, they were back to placing much more emphasis on integration rather than either content or language on their own.

Rather unexpectedly, the language teachers placed more emphasis on content than on language in session 2, but this did not occur again in the rest of the sessions. In sessions 3 and 5, the language teachers' focus is very integrative, but in session 4 a similar effect occurs to that which affected the content teachers. When discussing their rankings of texts, the language teachers return to their own territory, by emphasizing language over either content or integration. In terms of a possible shift towards more integrativeness, it is noticeable that, for both types of teachers, the final session has a strong focus on integration.

Turning to research question 4, we focused on the distribution of the three insights (purist, situational and doctrinal) across participants and knowledge focus (Figure 2).

When referring to content, all three types of participants used predominantly the purist insight (OR+/DR+). This indicates, that in this knowledge domain, both 'what' and 'how' are given importance, the students need to know the science or physical education concepts, but they also need to work with them in the correct ways. When referring to language, it is noticeable that content teachers use the doctrinal insight (OR–/DR+) as much as the purist one. They sometimes highlight procedures without referring to the actual knowledge to be learnt. Language teachers mainly see language as a knowledge focus

Table 5. Content teachers' reference to content, language or language and content integration over the four sessions.

Knowledge focus	Session 2		Session 3		Session 4		Session 5	
	N	%	N	%	N	%	N	%
Content	36	48.0	7	21.2	44	46.8	7	19.4
Language	0	0.0	4	12.1	19	20.2	5	13.9
Content and language integration (CLI)	39	52.0	22	66.7	31	33.0	24	66.7
Total	75	100.0	33	100.0	94	100.0	36	100.0

Table 6. Language teachers' reference to content, language or content and language integration over the four sessions.

Knowledge focus	Session 2		Session 3		Session 4		Session 5	
	N	%	N	%	N	%	N	%
Content	35	30.7	3	5.0	12	24.0	4	8.0
Language	25	21.9	15	25.0	23	46.0	10	20.0
Content and language integration (CLI)	54	47.4	42	70.0	15	30.0	36	72.0
Total	114	100.0	60	100.0	50	100.0%	50	100.0%
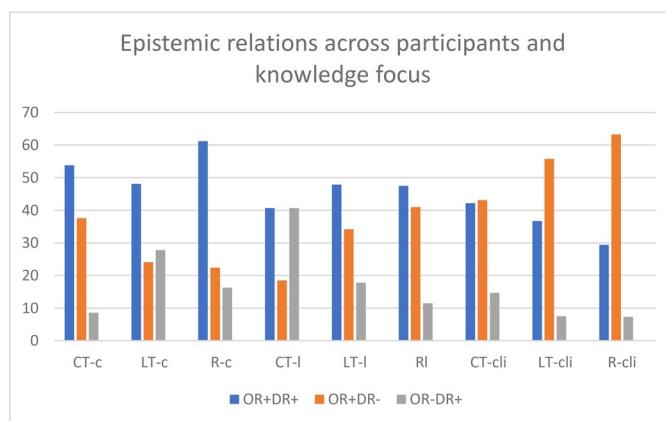
Figure 2. Epistemic relations across participants and focus.[2]

from a purist perspective, so that it is important not just to know about language features, but they need to be used appropriately. For all three types of participants, language and content integration is mainly seen as situational (OR+ DR–)—what is to be known (about integration) is emphasized over ways of integrating. However, it is the content teachers who seem to have a more balanced view, as they see integration almost equally from a purist and situational perspective, and even to a considerable extent from a doctrinal perspective. The overall strength of the situational insight when the knowledge focus is on integration seems to suggest that, in spite of the practical focus of the seminar, language and content integration was still largely being seen as a theoretical matter. This means that the participants were working more in the *analyst* than in the *teacher* dimension of TLA.

For the final research question (RQ 5), we looked at the epistemic plane in relation to language and content integration over the four recorded sessions, looking for changes in the distribution of focus on content knowledge (*what*) and disciplinary procedures (*how*) (Table 7).

The first two sessions were dominated by the situational insight (OR+/DR−), which indicates that knowledge was being seen from a more declarative than a procedural perspective (again, the *analyst* dimension of TLA). However, in the last two sessions, the purist insight (OR+/DR+) was strengthened, indicating that, after putting the integration activities into practice, the teachers were incorporating more attention to the 'how'—the procedural aspects of integration, thus highlighting the *teacher* aspect.

In order to break these results down further, we look at how the content teachers' and language teachers' epistemic focus developed over the four sessions (Figures 3 and 4).

The results for content and language teachers confirm the overall picture as seen in Table 7. The situational insight dominates in sessions 2 and 3, while the purist insight takes over in sessions 4 and 5. For both sets of teachers, session 4 is something of an outlier in that the situational insight (OR+/DR−) is almost non-existent, which indicates that their justifications and reflections on the rankings of the students' texts were both the 'what' and the 'how', and quite often there was a focus only on the 'how'. In judging the students' texts, both content and language teachers were concerned about the way they had approached the tasks, not just the knowledge they displayed in them.

Table 7. The epistemic plane in relation to language and content integration over the four sessions.

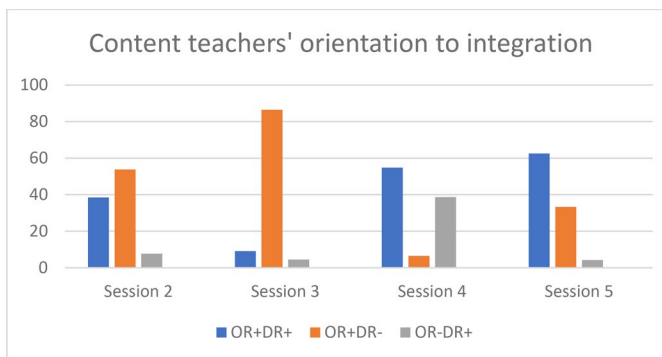| CLI-insights	Session 2		Session 3		Session 4		Session 5	
	N	%	N	%	N	%	N	%
Purist (OR+/DR+)	83	28.0	9	5.8	47	62.7	76	51.0
Situational (OR+/DR−)	196	66.2	127	82.5	8	10.7	69	46.3
Doctrinal (OR−/DR+)	17	5.7	18	11.7	20	26.7	4	2.7
Knower/no insight (OR−/DR−)	0	0.0	0	0.0	0	0.0	0	0.0
Total	296	100.0%	154	100.0%	75	100.0%	149	100.0%

Figure 3. Content teachers' orientation to CLI according to insight over the 4 sessions.
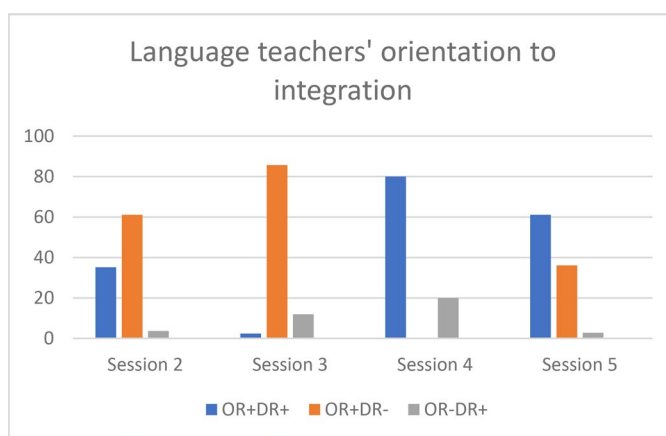
Figure 4. Language teachers' orientation to CLI according to insight over the 4 sessions.

Discussion

The results overall provide evidence that the 'metatalk' (Watson et al., 2021) in the seminar sessions was an affordance for the teachers to activate particularly the *analyst* and *teacher* domains of TLA (Edge, 1988; Wright; 2002) thus transferring declarative knowledge to procedural knowledge (Andrews, 2007). The intervention provided a structured context for collaboration and dialogue, which are seen as essential for the development of CLIL teachers' language awareness (He & Lin, 2018). It also ensured that the activities the teachers were engaged in were on-site, and thus had properties of what Lo (2020) describes as 'Model 1' professional development (cross-curricular collaboration between content and language teachers in schools with CLIL programmes). These activities were also part of the normal tasks of teaching, which is another condition for successful development of teachers' language awareness (Bartels, 2009). While unsurprisingly content and language teachers paid more attention to their own disciplinary domains, there was ample evidence that they were able to both 'look across' to the other disciplinary domain, and, more importantly, to adopt an integrative approach to content and language learning. So, while language teachers tended to focus on linguistic forms, there was evidence that they were aware of their importance for content learning (Hu & Gao, 2021). Overall, language and content integration (CLI) had a stronger presence than either language or content on their own.

The results also show the importance of not only identifying these knowledge categories in the seminar metatalk, but also of examining the organizing principles of these knowledge practices with the tools of LCT. Thus, the different types of knowledge exhibited varying strengths of ontic and discursive relations, with evidence of a shift from the situational insight in which there was a stronger focus on the new concepts the teachers were encountering, to the purist insight, where both 'what' and 'how' were important. In this way, LCT tools can throw more light on the declarative and procedural dimensions of TLA (Andrews, 2007), by taking these essentially psychological constructs and showing how they relate to the organizing principles of knowledge practices. As Xu and Harfitt (2019) point out, there needs to be a strong focus on the procedural dimension of CLIL

teachers' language awareness, as this is what allows them to use scaffolding techniques to support their students' learning. The purist insight in LCT can show clearly the links between declarative knowledge (the 'what') and procedural knowledge (the 'how') and highlight the importance of both dimensions being linked. When CLIL teachers are able to transfer declarative knowledge to procedural knowledge by working in a purist insight, they activate not only the *analyst* but the *teacher* dimension of language awareness and are enabled to overcome the tension identified by Martínez and Domínguez (2018), in which they are pulled in different directions without really knowing how to act. Moving towards a more integrative perspective with a purist insight seems to be the key to this.

The study has some implications for what is meant by 'integration' in CLIL. As briefly mentioned above, when we were coding talk as language and content integration (CLI), we identified different levels of integration (Figure 5). When content or language were mentioned on their own, there was no integration. Content teachers could comment on how accurate an answer was in terms of science knowledge, or language teachers could comment on a students' use of a grammatical structure without relating its use to the content task. Moving along the continuum, teachers sometimes mentioned language and content together, such as in comments about a text being well written, or the need for students to use English in a particular content task. This can be seen as a simple juxtaposition of language and content, with no attempt to integrate them pedagogically. A further step towards integration is when there is a balance between language and content. Specific language objectives are identified for content learning tasks (for example, a tense or the passive voice), and there may be some pedagogical focus on these forms. This is similar to the CAPA approach (Tedick & Lyster, 2019) in which instructional sequences move through an alternating focus on content and language. The strongest form of integration is seen when language is directly linked to disciplinary meaning-making, as when constructs such as CDFs and genre are used in planning, implementing, and assessing instruction (Llinares et al., 2012; Morton, 2020). We would argue that when CLIL teachers are trained to be *analysts* using these tools and supported in transferring this declarative knowledge to the procedural *teacher* domain through collaborative dialogic activity embedded in their contexts and normal tasks of teaching, then they can achieve this deeper level of integration in their pedagogical practices.

Conclusion

This study investigated CLIL teachers' language awareness as it was manifested in dialogic talk as part of a collaborative professional development activity. It combined the cognitive perspective on language awareness with its declarative and procedural knowledge
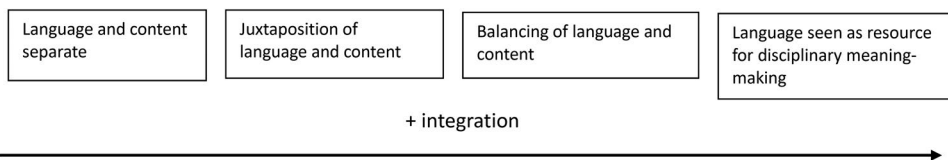
| Language and content separate | Juxtaposition of language and content | Balancing of language and content | Language seen as resource for disciplinary meaning-making |

+ integration →

Figure 5. Continuum of integrativeness in CLIL teachers' language awareness.

dimensions with a social realist approach (LCT) which explored the organizing principles of the teachers' knowledge practices. The results show that the teachers' language awareness was related to three different knowledge domains: content, language and language and content integration, and that there were different levels along a continuum of 'integrativeness'. The study provides evidence that CLIL teachers' language awareness can best be developed when they are engaged in collaborative activity which is close to their worlds of practice.

The study has limitations in that it was carried out in one school with a small group of teachers, and only covered three academic subjects (science, physical education and English). Further studies could include a wider range of educational levels and academic subjects and track the development of participants' TLA longitudinally. Nevertheless, in spite of its limited scale, we are confident that the study shows the promise of the collaborative, on-site approach to professional development in fostering teachers' language awareness for integration in CLIL. We also believe that the study shows the potential of the conceptual tools (cognitive approaches to TLA and LCT) which can be used to investigate and improve knowledge-building practices in CLIL teacher education and professional development contexts.

Notes

1. The teacher was, in fact, trying to elicit a sequential explanation.
2. CT stands for content teacher, LT for language teacher and R for researcher. These abbreviations are followed by c, l or cli (for content, language or content and language integration, respectively).

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