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Exploratory Interactive Explaining (EXINTEX): Constructing Disciplinary Knowledge in Two Multilingual University Settings

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The rise of English-medium education has led to considerable academic interest in communicative practices in multilingual university settings. However, there is still little research into disciplinary knowledge construction in higher education contexts where English is the academic lingua franca. To address this gap, we embrace the central role of explaining in education by proposing Exploratory Interactive Explaining (EXINTEX) as an analytical tool, which identifies the elements of explanatory episodes in the joint development of disciplinary knowledge. We then apply this tool at the micro-level of interaction to two comparable contexts differentiated primarily by the presence or absence of a teacher. Our findings confirm the relevance and high level of educational success of EXINTEX episodes in both quantitative and qualitative terms. They further reveal the dynamic interplay of epistemic authority and engagement in the learning process. Additionally, they show how research into educational disciplinary discourse and English as a lingua franca in academic settings can complement and supplement each other.

INTRODUCTION

The surge in internationalization in higher education since the turn of the millennium often implies Englishization (Lanvers and Hultgren 2018). Largely focusing on the impact of changing the medium of instruction to English, research to date has examined a range of issues such as the question of (student and teacher) proficiency levels, the impact of the medium of instruction on content and language learning outcomes and on pedagogical considerations, or affordances and challenges for heterogeneous learner groups (e.g. Valcke and Wilkinson 2017; Dafouz and Smit 2020). These various research foci can be brought under the umbrella term of English-Medium Education in Multilingual University Settings (EMEMUS; Dafouz and Smit 2016), which

highlights the complex and dynamic interplay of macro-, meso-, and micro-levels as well as the diverse manifestations of EMEMUS and their analysis.

Typically, such investigations take place at the macro- or meso-level, thus once removed from the educational practices themselves. Additionally, many of the contexts examined are effectively bilingual rather than truly multilingual and multicultural learning spaces. An exception to both of these critiques is the research on English as a Lingua Franca (ELF) in academic settings, which addresses the micro-level of interaction, examining lectures and academic events, such as seminars, conferences and thesis defenses (e.g. [Mauranen 2012](#); [Björkman 2013](#)), and extra-curricular or social encounters ([Kalocsai 2013](#); [Siegel 2018](#)). Yet this perspective still lacks research examining the learning process of jointly constructing knowledge itself, although this process is central to academic disciplines. As fields of study or expertise, disciplines comprise specialized communities in which there are 'agreed-upon conventions that guide the production, communication, and critique of ... knowledge' ([Gabriel and Wenz 2017](#): 1). To date, ELF-oriented investigations from classroom talk ([Smit 2010](#)) and task-oriented group work (e.g. [Mortensen 2014](#); [Hynninen 2016](#)) have mainly examined the communicative and interactive dimension, with the disciplinary content being somewhat neglected (but see [Björkman 2018](#)). Finally, existing studies on educational talk in EMEMUS have exclusively investigated a single institutional setting. It has therefore become very clear that EMEMUS is extremely context-dependent in terms of why and how it is implemented, highlighting a research gap for cross-site comparisons that would make it possible to identify shared features while underlining localized patterns, particularly with regard to learning processes. While it is hardly ground-breaking to argue that the rapid changes in higher education in Europe add complexity to learning and teaching processes, we believe that the impact of these changes on such processes has not yet been fully addressed. Competition on the global higher education market places additional pressures on lecturers to deliver high-quality teaching while the implementation of EMEMUS brings new challenges into the classroom. On the one hand, the medium of instruction is a second language for the vast majority of participants. On the other, the student groups are not only characterized by diversification in terms of linguistic and national background but also academic background and work experience.

One discourse function that has been repeatedly identified as integral to education across a range of sites is explaining ([Leinhardt 2001](#); [Dalton-Puffer 2007](#); [Ehlich 2009](#)). As such, it represents a valuable point of access for researching the construction of disciplinary knowledge in EMEMUS. To bridge the gap between interactionally oriented ELF research and studies into explaining with a focus on content knowledge in less heterogeneous settings, we propose an analytical tool called *Exploratory Interactive Explaining* (EXINTEX), which synthesizes research into explaining in mono- or bilingual contexts with insights from multilingual and multicultural learning spaces. This article therefore begins by contrasting educational talk in EMEMUS with

bilingual teaching in secondary schools. It then dives deeper into learning as a social activity, focusing on how teachers and students use explaining in EMEMUS to jointly construct disciplinary knowledge in a lingua franca, and proposing EXINTEX as a tool for analysing the knowledge construction process. Following this, we present data from English-medium programmes in two Austrian higher education institutions to illustrate the relevance of interactive explaining in quantitative terms and by examining how participants jointly construct disciplinary knowledge. We finish with some implications for teaching and learning in EMEMUS and for future research.

EDUCATIONAL TALK IN L2 SETTINGS

Since the turn of the century, the higher educational sector has been shaped by endeavours to integrate ‘an international or intercultural dimension into the tripartite mission of teaching, research and service’ (Maringe and Foskett 2010: 1). These are remarkably diverse, but all share one common feature: the ever-increasing use of English as an academic lingua franca, or (only) shared code, both within and outside the classroom in contexts that are traditionally not English-speaking. This has had significant implications for teaching and learning.

Learning as a social activity: from monolingual to multilingual contexts

Thanks to a good 30 years of intense research into classroom discourse (e.g. Lemke 1990; Christie 2005; Markee 2015), we know that learning a subject is closely related to managing its discourse. While this interrelatedness of language and learning started to be researched in English-dominant, educationally monolingual settings, it has more recently also become a focus of investigating Content and Language Integrated Learning (CLIL).¹ In both settings, studies have highlighted the educational relevance, potential and challenges of, for instance, genres (Christie 2005; Llinares et al. 2012), discourse functions (Mohan and Slater 2005; Dalton-Puffer 2013), or argumentation (O’Hallaron and Schleppegrell 2016; Hüttner and Smit 2018) for the joint process of knowledge development. Studies into CLIL have also shown that it tends to be supported by use of the L1, revealed in the prevalence of translanguaging for communicative and pedagogic purposes (e.g. Moore and Nikula 2016).

In contrast to the effectively bilingual context of CLIL research, EMEMUS is characterized by the second ‘M’, that is, truly multilingual environments whose constellations keep changing depending on who is participating in any given communicative event (Dafouz and Smit 2020). We prefer EMEMUS to the more widely used English-Medium Instruction as it is semantically wider and more transparent, recognizing that education also takes place outside instructional settings. In such multilingual environments, English is thus the

main lingua franca, with participants also drawing on other languages for specific and limited communicational purposes (e.g. Söderlundh 2012; Jenkins and Mauranen 2019; Smit 2019). Research into ELFA certainly recognizes the inherently multilingual nature of interactions and potential challenges in these settings, reporting that participants make ample use of pragmatic strategies such as signalling, repetition, repair, and rephrasing to enhance communication (Mauranen 2012; Björkman 2013). The participants in Hynninen's (2016) study also frequently topicalize the fact that English is not their first language, drawing attention to whom they turn to as language and content experts. Languages other than English can play an important social role both within and outside the classroom, with communities of practice adopting words and phrases from other languages into their shared repertoires (Kalocsai 2013; Komori-Glatz 2017). Recent studies thus confirm a general readiness of students and teachers to invest extra time and effort in constructing their ELF educational talk (Smit 2010; Björkman 2018). However, they also show that contextual factors strongly impact academic communication (Kaur 2018). Disagreeing, for instance, can be realized in rather different ways depending on contextual features (Komori-Glatz 2018; Toomaneejinda and Harding 2018). In short, these studies pay considerable attention to how lecturers and students highlight key information and enhance comprehension through pragmatic strategies and metalingual or metadiscursive commentary, often with a high degree of communicative success. Nevertheless, there is still a lack of research looking at the actual learning process and the process of jointly constructing robust content knowledge over the course of an interaction. This is particularly true of semiformal educational settings outside the physical classroom (Komori-Glatz 2017; Dafouz and Smit 2020).

Knowledge construction: explaining and epistemics

As the prototypical discourse function revealing the process of joint knowledge construction at the micro-level of interaction, explaining 'is one of the main ways in which an object, fact, term, or concept—referred to as the "explanandum" – is "unpacked", its core components revealed, and its knowledge structures made visible' (Komori-Glatz 2017: 114). Explaining lies at the core of education, and is a central element of instruction, tutoring and even self-propelled learning (Leinhardt 2001; Roscoe and Chi 2008; Esmonde 2009). At this general level, explaining combines different subtypes, such as explaining WHAT, explaining HOW TO, and explaining WHY (Klein 2009) and is therefore a core function for the teaching and learning of any discipline. At the same time, the causal reading of explaining—explaining WHY—has been identified as the discursively narrower function (Dalton-Puffer 2013) that comes with discipline-specific features and requirements (e.g. Llinares and Morton 2010; Koole 2012).

Irrespective of type or discipline, oral educational explaining tends to be developed interactively, triggered by a (perceived) knowledge gap. In an

attempt to resolve the thus established explanandum, an explanation is offered, often in several stages and cycles, until it is discursively accepted and the respective knowledge item confirmed. Reflecting their educational role, teachers evaluate the quality of the explanation through explicit confirmation and/or correction of student suggestions (Ehlich 2009; Klein 2009). The teacher role also comes to the fore in the explanations themselves as teachers have been found to dominate the ‘explanatory space’, reducing possible student contributions to the ongoing elaborations (Dalton-Puffer 2007; Llinares and Morton 2010).

The explanatory dominance of the teacher reflects the didactic contexts usually investigated: either monolingual science classrooms (e.g. Lemke 1990; Mohan and Slater 2005) or language learning (e.g. Ehlich 2009). Consequently, these settings presuppose both a predominantly monolingual, or at most bilingual, educational context. As such, there is a clear difference between such settings and the multicultural, multilingual context of EMEMUS.

To address this gap, Smit (2010: 311–316) proposes the concept of ‘INTEX’ (*Interactive Explaining*). This places the focus firmly on the discursive complexity of classroom talk and the (shifting) participants’ roles in an international hotel management programme, integrating topic management and turn-taking into analyses of explaining. INTEX thus moves beyond the speaker–hearer or teacher–learner dichotomy to view interactional participants as jointly engaged in the sequential development of specific topics turned explananda, and the process of co-constructing disciplinary knowledge. This is done by identifying the linguistic realizations of topical actions (e.g. opening and closing) and of semantic relations such as elaboration. It also highlights the additional dimension brought by the multilingual, multicultural setting, and the effort participants are willing to make in jointly developing their educational discourse. This suggests that experienced ELF speakers may be more predisposed to engage in co-constructed explanations, as they realize and recognize the value of (or perhaps the need for) extensive negotiation of meaning.

Perhaps even more so than in general communicative contexts, explaining in educational settings draws strongly on the interplay and development of *who* knows *what* in any given interaction. For this reason, there has recently been some interest in using epistemics as an analytical tool in examining classroom discourse (e.g. Kääntä 2014; Jakonen and Morton 2015). The study of epistemics in linguistics is deeply rooted in conversation analysis and focuses primarily on examining ‘the knowledge claims that interactants assert, contest and defend in and through turns-at-talk and sequences of interaction’ (Heritage 2013: 370). The articulation of such a claim is referred to as epistemic *stance*, whereas the speaker’s access to (or ‘possession’ of) the knowledge is their epistemic *status*. The relationship between the participants’ knowledge can be one of the absolute epistemic advantage in which case, it is described as ‘knowing’/‘unknowing’ or it can be on a scale of ‘K+’ to ‘K–’ (Heritage 2013:

377). Additionally, a speaker can occupy congruent or divergent status and stance simultaneously by disguising a K+/knowing status with a grammatical form or morphosyntactic expression that expresses a K-/unknowing stance (or vice versa). For example, [Heritage \(2012: 6\)](#) illustrates how a speaker can hedge their epistemic *status* (of knowing that the other person is married) by occupying an unknowing or K- *stance* and phrasing it as a question ('are you married?', 'you're married, aren't you?').

As well as examining the interplay of status/stance, epistemics explores the *rights* to possess and articulate knowledge as well as to evaluate another's knowledge claim ([Raymond and Heritage 2006](#)). Factors that can grant an actor superior or so-called 'primary rights' to knowledge include first-hand, unmediated access to the topic (i.e. personal experience of it as opposed to having heard or read about it) and socially sanctioned authority, that is 'socio-epistemic rights' ([Raymond and Heritage 2006: 684–685](#)). In educational contexts, the teacher's institutional role can be seen as granting them these rights, whether they choose to occupy a knowing or unknowing stance (e.g. by making statements or asking display questions, respectively). However, this role can be muddled when teaching through a second language as they may not have greater access to linguistic knowledge relative to their students. In the absence of a teacher and their institutional role as an epistemic authority, students engaged in peer-to-peer learning are obliged to constantly negotiate and re-negotiate their relative access to knowledge domains and their epistemic status vis-à-vis their colleagues. Drawing on epistemics thus enables the researcher to identify and analyse the moment-by-moment negotiation of *who* knows *what* in the learning process and how explaining is used to bring participants to a relatively equal distribution of knowledge.

EXPLORATORY INTERACTIVE EXPLAINING (EXINTEX)

In order to integrate these diverse approaches to jointly constructing disciplinary knowledge in multilingual and multicultural educational settings, we propose EXINTEX as an analytical tool. This expands [Smit's \(2010\)](#) concept of INTEX by integrating exploratory talk as an additional dimension, in which 'partners engage critically but constructively with each other's ideas' and 'proposals may be challenged and counter-challenged but, if so, reasons are given and alternatives are offered' ([Mercer 2000: 153](#); see also [Barnes 2008](#)). EXINTEX draws explicit attention to the messier, dialogic nature of such joint constructions ([Mortimer and Scott 2003](#)) in terms of asserting, contesting and defending knowledge claims (i.e. *who* knows *what*), and also reveals how participants explore the application of these to contexts beyond the learning environment, for example by drawing on their work experience. It also recognizes that experienced ELF speakers are likely to appreciate the value of (or perhaps the need for) extensive negotiation of meaning. The synthesis of exploratory talk and INTEX thus acknowledges the dynamics of ELF educational interaction. Consequently, EXINTEX allows for a more comprehensive

analysis of joint disciplinary learning by identifying relevant episodes and shedding light on their constitutive elements.

Specifically, EXINTEX is a tool for analysing the interactional process through which the participants jointly explore, negotiate, and construct meaning in order to explain content-oriented topics. This process, presented in Figure 1, is initiated with participants topicalizing an explanandum by discursively indicating (the perception of) a knowledge gap; the topic is then developed in the ongoing interaction as long as participants continue to engage with each other's ideas. This may be repeated several times, potentially resulting in embedded sequences. Finally, the process ends with a linguistic realization that the knowledge gap has been filled and shared understanding has been achieved. We refer to the outcome of analysing educational discourse using EXINTEX as *EXINTEX episodes*, potentially comprising various *EXINTEX sequences*.

EXINTEX episodes can thus be highly diverse in terms of length, structural complexity, and explanatory strategies, as illustrated by the extracts included in this article. Extract 1 exemplifies the basic sequence of *topicalization—explanation—closing*, and how educational agents, that is students and teacher, engage in *elaboration* and *expansion* along the way. In pursuing their explanatory goals, participants draw on the communicative strategies mentioned earlier, for example repetition or repair, mostly in English as their lingua franca but also occasionally drawing on their multilingual repertoires. While these communicative strategies are an integral part of identifying and analysing interactive explanatory sequences, this article foregrounds the disciplinary focus of the explanations and their impact on enabling students to develop their content knowledge.

Taken from a theoretical lesson on nutrition and cooking, Extract 1 includes an example of teacher-led interactive explaining of how to defrost frozen fish

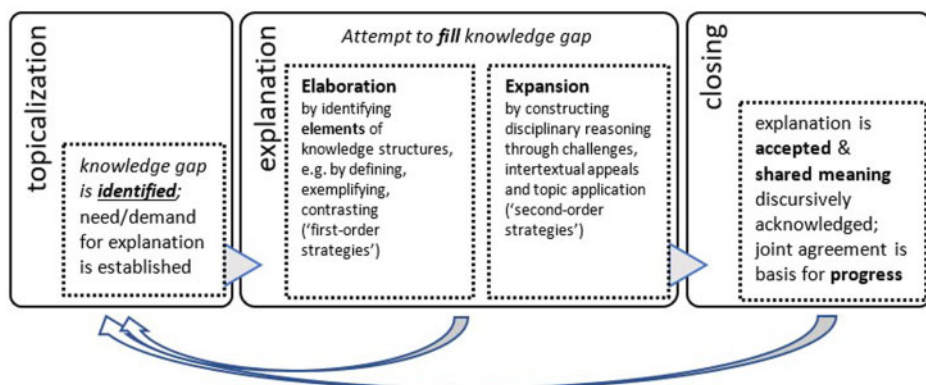


Figure 1: EXINTEX—Exploratory Interactive Explaining (based on Komori-Glatz 2017: 129).

Extract 1. Classroom Data (2cook2) 'defrosting fish'^a

- 1 T (1) defrost. (1) you have to defrost [fish] (.) where. (1) on the fruit-board uh: (.) in kitchen; (.) uh:
- 2 Evak preparation?
- 3 T in the staff canteen (.) where.
- 4 Clap preparation
- 5 SX-f (staff can-)
- 6 T in the?
- 7 Evak preparation
- 8 SX-f <4>(special)(xx)</4>
- 9 T <4>prep area</4> (.) in the preparation area (.) um (2) maybe (.) in the fridge. (1) it means (.) not in room- (.) not at room temperature (.) you have to defrost (.) IN fridge
- 10 Lura (1) so the <5>best way</5> possible
- 11 SX-1/2 <5> slow process </5>
- 12 T in fridge. (1)
- 13 Lura so that's the way to defrost. (.) in a: (.) fridge
- 14 T in the fridge.
- 15 Lura OK. (.) <6>(xxx)</6>
- 16 T <6>but some</6> times. (.) or very often (.) you you are in a hurry? (1) yeah (.) and so you defrost (.) uh in the (.) in the fish prep area.
- 17 Lura OK
- 18 T =that's OK . (.) because (.) ä if you defrost IN fridge
- 19 SX-m (x) (.) <7> (xx) </7>
- 20 T <7> it needs </7> (1) minimum (.) two hours (.) uh: not two hours (.) two DAYS
- 21 Lura OK
- 22 Kosk some people (de)(.)frost <8>(.) the (.) (things)</8>
- 23 SX-m <8>fridge @@@</8>
- 24 Kosk in the microwave. (1) <9>(xxxxx)</9>
- 25 T <9>uh (1)</9>
- 26 [Ss start chatting again]
- 27 T uh you('ll) lose quality (1) you('ll) lose quality if you defrost in microwave (.) that's the (.) we: call it (.) the housewife (.) idea to defrost (.) but the quality goes down
- 28 Crik (1) but but some of the fish which you buy: (.) with (eighteen/eighty) minus (eighteen/eighty) degrees
- 29 SX-m (yahyah)
- 30 Crik it's written that you have to do it (.) frozen in the (pan/pen). (.) or in (the) hot oil

(Continued)

Extract 1. Continued

31 T uh: yes (.) but i:f you (.) if you place (.) the fish frozen in the pan (3)
 uh: it's very very difficult? (1) to p- to pan-fry? (.) on one hand? (.)
 and on the other hand (.) uh: it needs (2) really (1) a long time to:
 (.) be well cooked in the middle if it's frozen. (1) so (.) uh in the pro-
 fessional kitchens (.) we defrost. (.) first. (2) defrost in fridge? OK?
 (.) what's next?

^aTranscription conventions: '(.)' short pause; '(1) (2)' pauses in seconds; '<1> </1>' overlap; '=' latching; '@' laughter; 'a:' lengthened sounds; 'TEXT' emphasis; '(xxx)' unintelligible; '(text)' uncertain transcription; '<spel>' spelling individual letters; '[text]' clarification or context.

in a professional kitchen. This extract, which shows a complete EXINTEX sequence, is nested in a longer episode elaborating cooking procedures. It draws on the teacher's expertise as a professional chef and the information provided in the teaching materials but also the hands-on experience students gained in their practical cooking lessons. Building on the preceding exchange, the teacher topicalizes (in an elliptical manner) the procedure for defrosting fish (t1),² which leads students to suggest possible locations (t2 – 8). The teacher evaluates these and introduces temperature as a new quality criterion (t9), which triggers another elliptical topicalization from Lura (t10), aiming to establish 'the best possible [way of defrosting fish]'. In the ensuing exchange, the fridge is identified as this 'best' possibility (t9, t12, t14), while the teacher acknowledges the preparatory area, originally suggested by students (t4 + 7), as a fall-back option, especially when under time pressure (t16, t18, t20). These elaborations are followed by an expansion phase, including two student challenges suggesting alternative defrosting methods, namely the microwave (t22 + 24) and the frying pan (t28 + 30). In both of these challenges, students draw on intertextual references to back up their claims ('some people defrost ...', t22; 'it's written that you have to ...', t30). The teacher, on the other hand, counter-challenges each of the suggestions ('lose quality', t27; 'very difficult [.]; and needs a long time', t31), contrasting the 'housewife method' (t27) with what is done in a 'professional kitchen' (t31). Finally, the teacher closes the sequence with 'OK? (.) what's next?'. While the brief pause would have allowed a student to raise another topicalization, the 'what's next?' establishes the matter as finalized.

This extract exemplifies how the participants contribute to the explanatory process by drawing on both elaboration strategies as well as engaging in expansion (cf. Figure 1). Elaboration here refers to *first-order* explanatory strategies that identify the core components of the concept, such as clarification, exposition, or exemplification. In contrast, the expansion element draws on *second-order* explanatory strategies that construct logical sequences of reasoning and develop the explanations further. As seen in Extract 1, typical strategies are challenges and counter-challenges as well as 'intertextual appeals', that is,

instances of drawing on earlier discussions or other materials. Finally, although not included in this example, another strategy is a ‘topic application’, namely, a sequence that contextualizes the established knowledge item by testing its relevance to the learners themselves and embedding it in what they already know.

As an analytical tool, EXINTEX recognizes the complex and sometimes messy nature of explanations and examines the process of jointly constructing disciplinary knowledge in a multilingual and multicultural educational context. It gives space to (partial) explanations and sheds light on diverse explanatory elements that sometimes overlap. A detailed sequential analysis as illustrated here allows for a post-hoc identification of elaboration and expansion strategies. This, in turn, reveals the process of knowledge construction: not only WHAT they establish but HOW they do this jointly. In other words, it reveals the distribution of knowledge and how participants contribute to constructing a mutually satisfactory explanation as a basis for joint progress. In addition to participants aiming for a similar level of knowledge, the product of a successful interactive explanation holds up against the established disciplinary knowledge of the specialized communities.

STUDY DESIGN AND DATA SET

In order to examine both how participants in these EMEMUS contexts use explaining to jointly construct disciplinary knowledge and the value of EXINTEX as an analytical tool, we revisited data in our previous studies using EXINTEX with a view to answer the following research questions (RQs):

RQ1: How prevalent are interactive explanations and their components in EMEMUS discourse?

RQ2: How do participants use these explanatory processes to co-construct disciplinary knowledge with and without a teacher present?

RQ3: To what extent do these explanatory processes result in successful outcomes from the perspective of disciplinary knowledge building?

In the first of the two studies, [Smit \(2010\)](#) examines classroom discourse in a post-secondary hotel management programme in Vienna. Classroom data were collected and audio-recorded in several subjects and across three semesters, as well as interviews with students and lecturers on the programme. The programme teachers were largely L1 German speakers, while the cohort of 28 students represented 14 mainly European nationalities, with the Austrian group being the largest. More details of the original study can be found in [Smit \(2010: 102–121\)](#).

The second study, Komori-Glatz (2017), focuses on two student teams working on a project simulating a company's market entry as part of their marketing masters at a Viennese business university. The teams in question each comprised two Austrians and two non-Austrians from Brazil and Romania, and China and Russia, respectively, with varying levels of German proficiency. The teamwork took place outside the classroom and was audio- and video-recorded, with individual retrospective interviews. Details of the complete study can be found in Komori-Glatz (2017: 56–68).

Given the focus of the present study, a data set comprising part of each of the previous studies was selected to meet criteria of comparability and feasibility. The main criterion was choosing data from a phase towards the middle of the course once the students had become familiar with one another. The two subsets are also similar in size. The final data set for this study is outlined in Figure 2.

As Figure 2 shows, both sets of data share several underlying characteristics that make it possible to focus on differences deriving from the contexts of teacher–student and student–student interaction. As already stated, both original studies identified interactive explaining as a central element of the discourse analysed. Furthermore, the contexts in which these interactions are embedded are broadly similar. Both are clearly ELF settings, with participants from a range of linguacultural backgrounds, while sharing an Austrian bias due to their shared locations in Vienna. Likewise, they have a strong business orientation and the data reveal an interest in bridging the theory–practice gap, with students discussing key management concepts (2fin2, 2hom1, 2hr2), reflecting on hands-on vocational activities (2cook2) or simulating business practice (2law2, MktgA, MktgB). On the other hand, the teachers' presence or absence in the data was seen as a key difference that merited further attention, particularly in view of their institutional role as an epistemic authority.

	Classroom data			Teamwork data		
educational & interactional setting	undergraduate hotel management teacher-students (classes of 7-28 students)			graduate (masters) marketing student-student (groups of 3-4 students)		
recordings	Recording	#words	mins	Recording	#words	mins
	2cook2 (cooking)	9038	42	MktgA_1	25190	137
	2fin2 (finance)	6130	41			
	2hom1 (hotel management)	8531	46	MktgB_1	16658	140
	2hr2 (HR management)	8219	41			
	2law2 (Austrian law)	7279	49			
	Total	39197	219	Total	41848	277

Figure 2: Data set.

Reflecting the comparable research approach in both underlying studies, both data sets were transcribed according to the VOICE transcription conventions.³ In line with data collection ethics, all participants gave their informed consent. The data analysis was undertaken by both authors, supported by the analysis software NVivo 11. EXINTEX episodes were identified by applying the operationalized definition (see Figure 1). As is typical of qualitative research, this was done iteratively. Starting with a subset, we identified episodes individually and then compared them in joint sessions, discussing and resolving disagreements in relation to the EXINTEX tool, which, in turn, was further refined. This procedure was applied several times until the whole data set was coded and full agreement was reached on the episodes and their structure.

In response to our research questions, the data were analysed by applying a mixed-methods approach, using descriptive quantification for capturing the frequency and distribution of EXINTEX episodes and their constitutive parts in the data sets (RQ1) and then combining it with socio-cultural discourse pragmatics (Komori-Glatz 2017: 106–108) in pursuit of RQs 2 and 3. The next section addresses each of these in turn.

FINDINGS AND INSIGHTS

A quantitative sketch of EXINTEX

As summarized in Figure 3, EXINTEX episodes make up a large part of the whole data set, with 164 EXINTEX episodes comprising almost 53% of the recordings. In other words, more than half of the educational talk included in this data set was dedicated to explaining disciplinary content interactively.

Given their comparable size in words (see Figure 2), a direct comparison of the two subsets is possible. Figure 3 shows that Teamwork Data includes a markedly larger number of episodes (115 versus 49) that, however, cover 8% less of the respective subcorpus (49% versus 57%). When zooming into the individual recordings, though, the figures reveal some variation in terms of absolute frequencies and coverage, ranging from 46% for MktgB_1 to 64% for 2hom1. While the latter numbers underline the centrality of explanations for educational interaction—making up between half to almost two-thirds of the

Classroom Data			Teamwork Data			Total	
	#	coverage		#	coverage	#	coverage
Total	49	57.01	Total	115	49.16	164	52.91
<i>2cook2</i>	14	55.10	<i>MktgA_1</i>	66	51.61		
<i>2fin2</i>	7	47.88	<i>MktgB_1</i>	49	46.42		
<i>2hom1</i>	12	64.05					
<i>2hr2</i>	5	48.11					
<i>2law2</i>	11	66.75					

Key: # = absolute frequencies; coverage = text coded as this element as a percentage of the respective data set, measured in characters

Figure 3: EXINTEX episodes.

recordings—the absolute frequencies point to considerable variation in terms of length of episodes, with Classroom Data presumably containing longer EXINTEX sequences.

Figure 4 provides basic information on the main EXINTEX elements and their frequencies, given in absolute terms ('#') and in relative ones ('coverage'). It shows the range of coverage for the five Classroom Data recordings and both figures for the Teamwork Data. Like the percentages in Figure 3, the coverage figures in Figure 4 show how EXINTEX elements vary across individual recordings, while being relevant to all of them.

When turning to the individual elements in Figure 4, we can see that there are twice as many topicalizations as EXINTEX episodes (377 versus 164), indicating that many episodes consist of various loops of explaining sequences, addressing two or more explananda. This is also reflected in the more than 200 closings that surpass the total of 164 episodes. However, the number of Classroom Data closings is very similar to the overall number of EXINTEX episodes (50 versus 49), thus indicating that they are closed more decidedly when a teacher is present (see Extract 1). The third and fourth EXINTEX elements, elaboration and expansion strategies, comprise the explanation proper. As the strongest group in absolute and relative terms, elaboration is indisputably central to explaining. Expansion strategies typically play a small but important role, being used more often than closings. However, the range in frequency reveals that they are used differently across the various settings.

Co-constructing disciplinary knowledge

While the quantitative data underline the relevance of interactive explaining in these contexts, the numerical range indicates the need to look more closely at how explanatory strategies are used across the two settings, Classroom and Teamwork. With the help of an illustrative extract from each—Extracts 1 and 2—this section aims to examine how participants co-construct disciplinary knowledge with and without a teacher present (RQ2).

In Extract 2, part of a longer episode, the students are discussing various factors they need to consider as part of their assessment of a new potential market based on information given to them in the course packet. The EXINTEX sequence begins with Christian topicalizing the concept of 'CIF' (t1) with a confirmation check ('right'), displaying his own knowledge, which is then

EXINTEX Elements	Classroom Data		Teamwork Data		Total
	#	coverage	#	coverage	
topicalization	148	4.4 – 8.9	229	8.5 + 10.1	377
closing	50	0.4 – 2.3	153	5.4 + 6.6	203
elaboration strategies	194	27.4–54.6	456	29.5+25.9	650
expansion strategies	91	3.6-5.1, 18.6*	192	9.3+6.5	283

* Of the five classroom recordings, four show a coverage of approximately 4%, while one is an outlier at 18.6%.

Figure 4: EXINTEX elements: absolute frequencies and coverage.

picked up by Benone's repetition of the word (t2). This repetition also indicates uncertainty, although this seems to be clarified to his satisfaction (t3–9). Qingling's referential question (t10), however, opens the explanandum again, for which the other students construct an explanation using a 'dictionary' definition of incoterms (t13–17), the numerous overlaps emphasizing the joint nature of this effort. They then offer examples of other incoterms (t18–25) and a more practical elaboration of what these represent (t26–31). In turn 32, Qingling claims a knowing stance and even contests Christian's statement, correcting 'customer' to 'carrier' (t34)—a challenge he accepts. The clear transition from Qingling's unknowing stance (t10) to claiming a knowing stance is particularly notable. The sequence ends with repetition of the correct concept and minimal signals of acceptance, indicating joint agreement (t36–38). Overall, the sequence clearly shows the tripartite EXINTEX structure, beginning with a topicalization, joint construction of an explanation with various individuals contributing to, building on, and even challenging each other's suggestions, and ending with a clear closing that, in this case, includes all participants.

While [Extracts 1](#) and [2](#) share this general structure, comparing them unveils the different dynamics of teacher–student interaction and student–student interaction. Closer scrutiny of the topicalizations, and how the participants respond to it, reveals their expectations of how knowledge is organized and distributed. In [Extract 2](#), topicalization is stretched over several turns (1–12) until the students establish what they are talking about and who does or does not know the concept. We also see a variety of strategies used to topicalize 'CIF' and 'incoterms', ranging from a hedged K+ claim ('it's an incoterm right', t1) to a K– stance ('what is (.) sorry', t10) and a query attempting to determine Qingling's status ('you know incoterms?', t11). Topicalization in the Teamwork thus not only involved identifying the topic to be explained, that is the explanandum, but also who laid claim to a K+ status and thus could take the lead in offering and evaluating an explanation.

In contrast, topicalization in the Classroom often took the form of a display question, representing an incongruence between the teacher's encoded K– stance and their epistemic status. In [Extract 1](#), for example, the instructor's rather elliptical question ('you have to defrost [fish] (.) where', t1) is answered immediately with suggestions and counter-suggestions leading to the teacher's assessment of 'prep area (.) in the preparation area' as correct, indicating his primary rights to evaluate the proposal. Teachers' referential questions with a congruent K– stance/status address students' opinions and professional experience, pedagogical checks, or language-oriented concerns, such as word meaning. When students raised topics for explanation in the Classroom, they tended to do this in a question format, marking the need for further information more explicitly. In the Teamwork, in contrast, they used a range of strategies as in [Extract 2](#), indicating the more delicate negotiations of stance and status in a peer-to-peer context.

Extract 2. Teamwork Data (Mktg_A) 'incoterms'

- 1 Christian it's an it's an incoterm actually right (.) <spel>cif</spel> (.) cost insurance freight
- 2 Benone incoterms?
- 3 Christian yeah (.) you know
- 4 Carina mhm
- 5 Christian and=
- 6 Benone =<spel>cif?</spel>=
- 7 Christian =<spel>cif</spel> is <226>an incoterm </226>
- 8 Carina <226>mhm</226>
- 9 Benone yes yes yes yes yes
- 10 Qingling what is (.) sorry
- 11 Christian <spel>cif</spel>? (.) you know incoterms?
- 12 Qingling ss (.) what
- 13 Christian INcoterm (.) i: t- is
- 14 Benone there are terms for deliveries
- 15 Carina yeah: it's like official: l
- 16 Christian in- (1) interna<227>tio-</227>
- 17 Carina <227>interna</227>tionally u- internationally used terms for
- 18 Benone <spel>(cpt. dap. cif.)</spel> yeah (2) <spel>cif</spel> is <228>only for</228>
- 19 Carina <228>ex work</228> <229>ex work no</229>
- 20 Christian <229>if you think about it</229> ah yeah yeah you have ex work <230>you have</230>
- 21 Carina <230>ex work</230>
- 22 Christian deliver duty paid=
- 23 Benone =yes
- 24 Carina yeah
- 25 Benone <spel>dap</spel> deliver at the point <spel>dat</spel> deliver at terminal: <spel>cpt</spel>
- 26 Christian and the actually defines when the: (1) at: (.) <231>what point</231>
- 27 Benone <231>i worked with them you know</231>
- 28 Christian at what point the risk (1) goes over from <232> the</232>
- 29 Benone <232>mhm</232>
- 30 Christian manufacturer
- 31 Benone <233>to the shipper</233>
- 32 Qingling <233>i see yeah</233>
- 33 Christian <234>to the customer</234>
- 34 Qingling <234>the carrier</234>

(Continued)

Extract 2. Continued

35	Christian	uh to the carrier
36	Benone	to the carrier
37	Qingling	yeah
38	Carina	mhm

The teachers' rights to disciplinary knowledge are clearly acknowledged in the closing turns, which were usually brief and instigated by the teacher, as in [Extract 1](#), confirming the acceptable explanation before moving on to a new topic. In marked contrast, the extended closing turns in the Teamwork, as exemplified in turns 34–38 of [Extract 2](#), suggest that the participants sought consensus and 'joint accountability' as the basis for moving forward.

Similarly, using EXINTEX to examine the explanations themselves reveals nuances that might otherwise go unnoticed. Both contexts presented a range of elaboration strategies, such as repetition ([Extract 1](#), t4, t7, t9; [Extract 2](#), t17–21), summarizing ([Extract 1](#), t13 + 31; [Extract 2](#), t26–35), defining ([Extract 2](#), t14–17), and emphatic backchannelling ([Extract 1](#), t15, t17, t21; [Extract 2](#), t4–5, t8–9, t23–24, t29, t37–38). Notably, in both contexts students frequently claimed a K+ status, especially when offering examples from personal experience as part of elaboration; in 2hom1, the teacher explicitly took a congruent K– stance/status to elicit these.

Additionally, expansion elements could also be found in both sets of data, albeit to a greater extent in the Teamwork, as expected (see also [Figure 4](#)). In the extracts presented here, the expansion elements primarily consisted of *challenges* and *intertextual appeals*, while other sequences also included *topic application*. The qualitative analysis of these elements revealed the social identity of the teacher as an expert coming through more consistently, whereas the rights to knowledge in the Teamwork remain more fluid and dynamic. While challenges and counter-challenges were made by teachers and students, the responses to and framing of these challenges differed between the two settings. In the Classroom ([Extract 1](#)), for example, students typically mitigated their challenges to the teacher's expertise by prefacing them with an alternative epistemic authority (i.e. an intertextual appeal), for example 'some people...', 'it's written that you have to...' (t22 + 30). The teacher's response presents a counter-challenge that highlights his professional expertise, contrasting the fact that you 'lose quality' (emphasized through repetition) with the 'housewife idea' with what 'we' do in a 'professional kitchen' (t27, t31). In contrast, the challenge in [Extract 2](#) (t34) is presented without any mitigation and accepted as a straightforward repair. Yet the episode only closes when the whole team has sanctioned the explanation (t35–38), especially Benone, who asserts his K+ status by claiming professional expertise ('I worked with them you know', t27). In other Teamwork examples, the

students invoke the authority of teacher's notes, slides or in-class comments. Similarly, in the Classroom, students might appeal to the teacher's own statements to back up their claims.

In short, EXINTEX is highly relevant as a tool for examining the interactive construction of knowledge in EMEMUS. It allows the analyst to identify WHAT is being explained as well as HOW the participants do this. Finally, integrating an epistemic perspective reveals the dynamic roles of the participants in the process of jointly constructing disciplinary knowledge.

Degrees of success in interactive explanations

Like the examples presented so far, most EXINTEX episodes can be considered satisfactory in terms of developing the explanation, that is from an interactional and thus emic perspective. They also meet etic criteria of success by corresponding to established disciplinary structures. However, our qualitative analysis revealed that, even when EXINTEX episodes were conversationally smooth, some resulted in the participants abandoning the explanandum or agreeing on an explanation that lacks in disciplinary appropriacy. We categorize such episodes as being of 'questionable success' (see Figure 5).

Overall and in each subset, roughly 17% of EXINTEX episodes are coded as 'questionable', which means that about five in six episodes did lead to emically satisfactory and etically successful outcomes for those actively participating in the interaction. The breakdown of relative frequencies in Figure 5 also shows that the degree of satisfactory and successful explanations ranges from 100% (2cook2, 2hr2) to <60% (2fin2). While there may be various reasons for this, the mere presence of a teacher does not seem to be the only one, particularly as regards abandoned explananda.

When turning to the handful of unsuccessful cases, there is an indication that such EXINTEX sequences in the Teamwork derived from a gap in content

	EXINTEX total	questionable success (#)	questionable success (%)
2cook2	14	0	0.00
2fin2	7	3	42.86
2hom1	12	1	8.33
2hr2	5	0	0.00
2law2	11	4	36.36
Classroom total	49	8	16.33
Mktg A	66	14	21.21
Mktg B	49	6	12.24
Teamwork total	115	20	17.39
Overall totals	164	28	17.07

Figure 5: EXINTEX episodes with questionable success, absolute, and relative frequencies.

knowledge that could not be filled. In the Classroom, in contrast, they rather arose from unconventional linguistic practices. Zooming in shows these variations in detail. First, in the Teamwork, a concept was discussed and negotiated, but the conclusion finally agreed upon was incorrect. A case in point is Extract 3 (see [Supplementary material](#)) in which the students established that a desirable rate of inflation would be between -1% and 2% . This conflicts with established economic knowledge, which typically sets a target between 2% and 6% , and certainly not $<0\%$ (see [Komori-Glatz 2017](#)). Secondly, the participants jointly agreed that they were unable to reach a satisfactory explanation with phrases like ‘it sounds weird’ or ‘let’s forget it’, and abandoned it to move on to the next topic (see Extract 4, [Supplementary material](#)).

Extract 5 ([Supplementary material](#)), taken from the Classroom, shows almost the opposite phenomenon. Here, it is clear that both the teacher and her students share a complete understanding of the disciplinary content; however, the term they agree on and use (‘specialist’) does not correspond to the established legal term (‘expert witness’). This illustrates how the teacher’s expertise in content, but also disciplinary language is unquestioningly accepted. While this episode shows communicative success and leads to a satisfactory explanation within the specific classroom, it fails to equip the students with the appropriate English terminology. In other words, such cases of contextualized lexical choices hint at a possible discrepancy between situated communicative success and appropriate disciplinary language.

Clearly, this is a small number of cases in a small data set, so these findings cannot be regarded as conclusive. It is also true that individual participants’ proficiency levels differed, with the Teamwork students being highly proficient while some of the Classroom teachers were less experienced users of English. Nevertheless, these insights reveal the value of EXINTEX in allowing us to evaluate explanatory sequences in terms of their product as well as their process. Furthermore, they suggest that the institutional roles have a bearing on how participants claim and are granted rights to knowledge in both linguistic and disciplinary terms.

DISCUSSION AND CONCLUSIONS

This study has shown that EXINTEX is a useful and innovative tool for analysing interactional sequences in multilingual contexts that use explaining to jointly explore and construct disciplinary knowledge. Building on previous ELF(A) research that examines the negotiation of meaning at the interactional level, EXINTEX offers insights into how this interaction also plays a key role in the development of disciplinary knowledge—in other words, the ‘agreed-upon conventions that guide the production, communication, and critique of ... knowledge’ ([Gabriel and Wenz 2017: 1](#)) established by expert communities and which go beyond the immediate site of interaction in EMEMUS. The prevalence of EXINTEX episodes, comprising half of the talk across the

two sets of Classroom and Teamwork data, indicates their relevance and importance for the learning process in EMEMUS.

In contrast to established research that largely focuses on teacher–student exchanges, our study reveals how educational content is jointly explained in different constellations of multilingual learners with and without a teacher present and with varying levels of content and language expertise. While the overall structure of EXINTEX episodes is similar across contexts, the absence of a teacher and their expert authority is reflected in the interactional work that students first put into topicalizing what needs to be explained and then agreeing on the newly established shared knowledge in rounds of closing. By doing so, they negotiate the parameters of the explanation in accordance with their shifting epistemic stances. With a teacher fulfilling the K+ role, these framing elements of EXINTEX can be established more quickly, thus potentially freeing time for the explanatory interaction itself, drawing on elaboration and expansion strategies. Co-constructed explaining in international higher education thus combines ELF communicative strategies and the negotiation of epistemic authority. Reflecting earlier ELF studies (Smit 2010; Hynninen 2016), disciplinary expertise includes technical vocabulary and the expressions necessary to talk about it. This means that teachers need to be aware that their linguistic practices come with a disciplinary relevance that goes beyond the respective educational setting. In other words, the main communicative aim of ELF discourse to make situated meaning-making possible needs to be merged with the communicative conventions of the wider expert community.

Taking cognisance of educational purposes as being integral to classroom discourse, EXINTEX allows for a two-pronged analysis of classroom talk by investigating interactional sequencing as well as its educational value, particularly for learners actively participating in the explanations. The former supports an emic evaluation of EXINTEX episodes as communicatively satisfactory; the latter captures the etic assessment of whether an explanation is successful in that it corresponds to established disciplinary knowledge. While ‘success’ is certainly not a monolithic or objectifiable concept, the relevance of wider norms and expectations for the value of educational explaining needs to be placed centre-stage when researching interaction in EMEMUS. By doing so, our study fills an important gap in ELF(A) research, which to date has been primarily focused on interactional success, somewhat neglecting educational outcomes. Instead of purely situated language use, ELF(A) research would benefit from recognizing educational aims as central to the ongoing communication and as part and parcel of the analysis (for a similar call, see Björkman 2018).

At the same time, ELF research creates affordances for studying education discourse(s). The detailed examination of communicative strategies in EXINTEX sequences suggests that EMEMUS participants apply their experience of negotiating meaning in general ELF contexts to produce,

communicate and critique disciplinary knowledge. Lacking a comparative data set, we clearly cannot claim that this prevalence is reserved for EMEMUS contexts; however, our findings suggest that experienced ELF speakers may be predisposed to engage in co-constructed explanations, even when these take place almost entirely in English.

Consequently, we argue that these extensive interactive explanations reflect the superdiversity of EMEMUS and a multilingual mindset. First, the diverse backgrounds of the participants inherent in EMEMUS bring a range of cultural and professional experience that may not be seen in less heterogeneous classrooms, and a smaller shared basis to start from. Secondly, the surface monolingualism of the explanatory interaction reflects an awareness of ‘repertoires in flux’ (Jenkins and Mauranen 2019: 6). The rare instances of translation or use of another language (e.g. ‘Gutachter’ in t10, Extract 5, [Supplementary material](#)) contrasts markedly with practices observed in bilingual educational settings (Moore and Nikula 2016; Smit 2019). In other words, the use of selective linguistic resources is contingent on the constellation of the participants and the purpose of the interaction. Furthermore, previous studies have found that the incidence of other languages in ELF interactions is influenced by the focus of such interactions. Komori-Glatz (2017) found a notably higher use of translanguaging in social or non-educational talk, even within the same group of interlocutors. Paradoxically, the more international and multilingual student groups become, the more monolingual the classroom discourse tends to be on the textual level, as participants cannot rely on a shared local language (Smit 2010, Söderlundh 2012). Thus, recourse to the frequent translanguaging characteristic of ELF interaction can actually prove to be counterproductive in truly international learning contexts (Jenkins and Mauranen 2019: 217).

In conclusion, where previous research into educational discourse focused on explanatory processes (in one language) as a transition from K– to K+ without paying attention to the complexity of diverse elements in this process, EXINTEX integrates an ELF perspective to reveal a nuanced interplay between the negotiation of meaning, repertoires ‘in flux’ and dynamic participant roles. With the diverse cultural, academic, and professional backgrounds that international students bring to EMEMUS, the participants not only negotiate meanings but also their roles in the interaction. While it lies beyond the scope of this article, the synthesis of ELF(A) approaches and educational discourse perspectives could be further developed by examining the enactment of epistemic status and stance in relation to identity theory, such as that proposed by Richards (2006). The dynamic interplay of discourse, situated, and transportable identities in EXINTEX episodes, particularly with regard to the claiming and assertion of expert (professional) knowledge status, could prove a highly fruitful avenue of further research.

NOTES

1 CLIL is an originally European approach to the teaching of content subjects in a second language with the aim to combine content with language learning (Dalton-Puffer 2007).

- 2 In the text, turns are referred to by t+numbers, e.g. t1 or t2-8.
- 3 See https://www.univie.ac.at/voice/documents/VOICE_mark-up_conventions_v2-1.pdf (accessed 25 March 2020).

SUPPLEMENTARY DATA

Supplementary material is available at *Applied Linguistics* online.

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