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Abstract

Epistemics in interaction refers to how participants display, manage and orient to their own and others' states of knowledge. This article applies recent conversation analytical work on epistemics to classrooms where language and content instruction are combined. It focuses on Epistemic Search Sequences (ESSs) through which students in peer interaction collectively resolve emerging knowledge gaps while working on pedagogic tasks. ESSs are initiated when a speaker displays an 'unknowing' epistemic stance by making an information request (IR) about some aspect of language or the content being worked on. We examine three different types of ESS: those in which a 'knowing' response is accepted by the initiator of the sequence; those in which there is an 'unknowing' response; and those where 'knowing' responses are contested. The findings have implications for understanding peer interaction in content-based classrooms in three areas: the affordances of peer interaction for learning in contrast with teacher-led 'known-answer' sequences; how learners manage rights and responsibilities around knowing or not knowing; and how learners discover and work on their own learning objects.

KEYWORDS: Epistemics; classroom interaction; conversation analysis; second language learning; content and language integrated learning (CLIL)

Epistemic search sequences in peer interaction in a content-based language classroom

INTRODUCTION

Since the mid-1990s, conversation analysis (CA) has been applied to the study of L2 talk-in-interaction, making important contributions to our understanding of L2 conversations both inside and outside language classrooms. CA studies of L2 classrooms have portrayed the reflexive relationship between the organization of interaction and shifting pedagogic focus (Seedhouse 2004), the interactional competences underlying the accomplishment of pedagogic tasks (Hellermann 2007; Hellermann and Cole 2009) and in carrying out such micro-level actions as conversational repair (Lee 2006). CA studies of L2 interaction in a variety of naturally-occurring settings (both inside and outside classrooms) such as those in Gardner and Wagner (2004) have shown that L2 conversations, in spite of obvious differences from L1 conversations, are in most respects normal conversations, being amenable to the same types of analysis as L1 talk-in-interaction. These studies show that in L2 conversations, participants rarely repair or correct linguistic errors, deploy highly sophisticated interactional competence even at very limited levels of linguistic proficiency, rarely orient to being an L2 user/learner as a salient aspect of identity, and show persistence as they work to establish shared understanding in conversations (Wagner and Gardner 2004).

More recently, the CA approach has been expanded beyond the description of L2 interactional practices to take on the thorny issue of L2 learning (Gardner 2008; Hua *et al.* 2007; Kasper 2009; Kasper and Wagner 2011; Lee 2010; Markee 2008; Pekarek Doehler 2010; Sahlström 2011; Walsh and Li 2013). In doing so, CA takes a very different perspective on L2

learning and acquisition from the mainstream cognitivist position in SLA, which sees language learning as an internal, individual process consisting in changes in mental states and representations (Atkinson 2011). In distinct contrast, CA-for-SLA, as this approach is labelled, sees 'cognitive' matters such as learning and knowing as visible, empirically describable processes made evident and accomplished in talk-in-interaction. Participants in interaction display and orient to their own and others' cognitive states, and use the ordinary resources of conversational interaction to find, work on, and resolve matters relating to what is known or unknown, in other words they 'do learning' (Sahlström 2011).

The study reported in this article applies a CA methodology to one specific type of L2 interaction, a classroom in which non-language subject matter is taught through an additional language, often referred to as Content and Language Integrated Learning (CLIL). In this classroom, participants use the L2 (in this case English) to carry out content, rather than language learning, tasks. In this sense, they can be seen to be using L2 talk-in-interaction for purposes other than, for example, the accurate production of L2 forms, or the expressions of personal meanings with the objective of practising fluency (Seedhouse 2004). Although discourse in content-based language classrooms has been a focus of research (see, especially, Dalton-Puffer 2007), so far a CA methodology has not been widely used to investigate interaction in these classrooms (but see Pekarek Doehler and Ziegler 2007 for an early example). Within a CA perspective, there has been growing interest in epistemics, that is, how knowledge is handled in interaction (Heritage 2012a, 2012b, 2013), and this interest is beginning to be seen in studies of multilingual classrooms (Koole 2010; Sert 2011, 2013; Sert and Walsh 2012). However, this work has focused on epistemic issues in teacher-student interaction. This article extends an interactional epistemics approach to a less-researched context, that of student-student interaction during the completion of pedagogic tasks in a content-based language classroom.

We examine interactional sequences in which students working in small groups identify and attempt to resolve knowledge gaps which come up in the course of completing content tasks set by the teacher. When students are working on, for example, a piece of writing on a history topic, they frequently find that they lack some information which is necessary for them to continue with the task. This can be the spelling or meaning of an item of vocabulary, or some fact relating to aspects of the content they are studying. On these occasions, the missing information can be requested from other students working in the same group, or in a nearby group. These information requests spark off what we have termed epistemic search sequences (ESSs) in which the members of the group collectively work to close the knowledge gap. In order to do so, they publicly discover, and work on, items to be known, at the same time orienting to different rights and responsibilities related to states of knowledge.

EPISTEMICS AND SOCIAL INTERACTION

There has been a recent surge in research on epistemic issues in social interaction (see e.g. Stivers *et al.* 2011a; Heritage 2012a, b, 2013). Underlying this interest is the claim that the interactional management of who knows what, how they come to know it, how reliable this knowledge is, and what assessments are implicated about what others know, are all key to understanding human sociality, particularly the preference for affiliation and the normative constraints on trespassing on others' epistemic territory. In this sense, knowledge in interaction is seen to have a strongly normative dimension, in that participants in interactions are held accountable for what they claim to know or not know, or what kinds of assumptions they display about others' epistemic states. This is what Stivers *et al.* (2011a: 3) mean when they claim that

the epistemic domain is 'morally ordered'.

Not only are individuals held responsible for what they are entitled or obliged to know, it seems that collectively, groups of speakers will take on joint responsibility for the epistemic welfare of an on-going interaction. Keevallik (2011: 186) notes that in everyday settings 'lack of knowledge is regularly treated as a joint problem and responsibility lies with all participants rather than with the answerer alone'. Keevallik attributes this to the fact that, in everyday interaction, rights to possess or demand knowledge are not linked to participants' roles, as is the case in institutional contexts where occupiers of certain (professional) roles will be treated as having superior epistemic access in certain domains. One interest of the present study is to show the ways in which lack of knowledge may be treated in peer interaction as a 'joint problem' and how the participants negotiate responsibility for knowing (or not knowing). Understanding such epistemic practices (Knorr-Cetina 2001) is fundamental to conceptualizing 'learning' in classrooms (Seedhouse *et al.* 2010). Rather than seeing learning as changes in participation over a relatively long time period, as in, for example, Hellermann 2007, a focus on epistemic practices sees learning as contingent, on-the-spot dealing with matters that hinder or permit the progressive unfolding of pedagogic activity (see Lee 2010).

Two key analytic constructs used in recent work on epistemics in interaction, which we also draw on in this study, are *epistemic status* and *epistemic stance* (Heritage 2012a, b, 2013). According to Heritage (2012b: 4), epistemic status refers to

the relative epistemic access to a domain or territory of information as stratified between interactants such that they occupy different positions on an epistemic gradient (more knowledgeable [K+] or less knowledgeable [K-])

Heritage points out that the gradient can vary in slope from shallow to deep, in that there may be lesser or greater differences between participants in the extent of epistemic access to the information or knowledge concerned. He thus sees epistemic status as an essentially relational concept, which not only varies between people and knowledge domains, but which can also vary from moment to moment over the course of an interaction.

However, even though relative epistemic status can and does shift during interactions, for the most part, participants do not continually negotiate epistemic status, and it is normally treated, as Heritage puts it, as a ‘presupposed or agreed upon, and therefore real and enduring, state of affairs’ (2012b: 6). This is in contrast to epistemic stance, which refers to how epistemic status is expressed through the design of turns in moment-by-moment interaction. Speakers use the resources of language, such as declarative and interrogative clauses and tags, as well as embodied actions, such as head shakes, to build into their turns an epistemic stance, in which they and their interlocutors are positioned in terms of the epistemic gradient as more or less K+ or K-. Regarding the crucial role of epistemics for talk-in-interaction, Heritage (2012b) argues that it is the relative epistemic status of the speakers, rather than morphosyntactically displayed epistemic stance, that defines whether a turn is requesting or asserting information. Thus, for example, a turn with the design feature of interrogative syntax will be interpreted as a request for information only if the speaker is presupposed to have a K- status with regard to the topic. Otherwise, it may be interpreted as a ‘known-answer’ or a rhetorical question (Heritage 2013: 386).

Epistemics in L2 classroom interaction

Recent work on epistemic practices in L2 classrooms has investigated how students display their

knowledge and understanding (Koole 2010) or the lack thereof (Sert 2011; Sert and Walsh 2012) in response to teachers' questions, as well as how teachers address students' epistemic problems (Koole 2012; Sert 2013). The work by Sert in particular has shown that when the teacher is involved in the interaction, the ways in which students' claims to lack of knowledge are handled make the institutional roles relevant. When students' responses to teachers' questions are delayed, teachers engage in embodied interpretative practices, such as scanning with gaze around the class or changing posture, using verbal 'epistemic status checks' such as 'you don't know?' and allocating turns to other students (Sert 2011: 35; 2013). Similarly, sometimes teachers' visual conduct may attend to the insufficiency of the student response as it is being formulated by withholding correct answers when using an answer key (Kääntä 2010: 193-211). There are thus clear indications that in several classroom contexts teachers are treated as responsible for both the epistemic 'state of play' and the progressivity (Stivers and Robinson 2006) of whole-class instructional interaction.

In contrast, in the context of interest in this study, the teacher is usually not a member of the various conversational floors which emerge with the interactional project of resolving knowledge gaps. Our focus is thus on how students themselves discover knowledge gaps and manage epistemic issues in peer interaction. Thus, by focusing on the management of epistemic issues in peer interaction, the study contributes to furthering understanding of how learning as an interactional process may go on in classroom contexts not directly controlled by the teacher. As such, it expands on previous research on small group interaction in language classrooms which focuses on how participants manage aspects of knowledge. For example, Szymanski (1999), looked at how third grade students seated in groups of three or four worked on reading and writing tasks which they were individually responsible for completing. The focus of Szymanski's study was on the methods used by participants to re-engage in talk after lapses, to make lapses in

talk relevant and to disengage from talk. One of the methods identified by Szymanski for re-engaging in talk after it had lapsed was through questions, which were often closely linked to the writing task students were engaged in. Thus, when students did re-engage in talk through questions they produced the kind of epistemically oriented sequences which are the focus of this study. Swain and Lapkin (1995, 1998) examined what they termed ‘language-related episodes’ (LREs) in peer interaction. They defined a LRE as “any part of a dialogue where the students talk about the language they are producing, question their language use, or correct themselves or others” (1998: 326). LREs are similar to the epistemic search sequences we describe in that students work together, mostly without the teacher, in resolving knowledge gaps. However, LREs cover a wider range of interactional phenomena (repairs, alternative suggestions, self-talk etc.), while we focus on one type of sequence: ESSs sparked by information requests. We also focus in much more detail on the ‘epistemic work’ that goes into the production of the episodes we analyse. Another difference is that LREs focus on language issues, but not on other content.

In sum, then, the focus of this study is on how participants in a content-based language classroom use linguistic (all available codes), embodied (gesture, gaze, movement) and artefactual resources in peer interaction to resolve knowledge gaps which come up in the course of doing pedagogic tasks. Specifically, the study focuses on three main aspects of this interactional management, relating to how participants:

- display their own and orient to others’ epistemic stance and status in relation to particular knowledge objects (whether ‘content’ or ‘language’ or other matters);
- manage rights, responsibilities and obligations towards what is known or unknown about the knowledge objects they focus on;

- build epistemic searches as interactional projects for resolving knowledge gaps by using the ordinary conversational resources of sequence organization.

In the following section, we outline the methodological approach used in investigating these phenomena.

DATA AND METHOD

This article draws on video-recordings of history lessons taught through English to students (aged 14 to 15 years) at a secondary school in Finland.¹ The lessons represent an elective module that was offered as part of the school's bilingual programme to native Finnish-speaking students, and were taught by an experienced native Finnish teacher who is fluent in English. During the course, the students were sitting in five fairly permanent groups of three or four students at each table, where they would work on their individual and group tasks as well as participate in regular teacher-led activities. Although the official pedagogic policy of the teacher maintained a monolingual English-only norm in the whole-class talk, the students would also use their native language, Finnish, in group talk alongside English.

To capture students' interactions within their group, the lessons were recorded with three cameras positioned in three corners of the room and with digital voice recorders at each table. The data were transcribed and analysed using Conversation Analysis methodology (see Sidnell 2010 for a review). Following this methodology, we made a collection of approximately 110 sequences in which participants in five groups identified and worked to resolve a variety of knowledge gaps, ranging from procedural to academic content or language related enquiries. In order to capture how these sequences played out, our transcripts include not only linguistic

phenomena, but also nonverbal conduct such as gaze and gesture through which the participants carried out these epistemic searches (see Appendix). Turns that include Finnish-language components have been both idiomatically translated (in italics) and interlinearly glossed (see Bickel *et al.* 2008 for the grammatical labels used).

ANALYSIS

In this section, we present analyses of epistemic search sequences (ESSs) through which students resolve gaps in their knowledge by soliciting help from their peers. An ESS is initiated when one student requests information regarding some item of knowledge necessary for completion of a task. Epistemically, an information request (IR) positions the requester as ‘unknowing’ (K-) with regard to the knowledge object being requested, and the addressed recipient(s) as a possible knower (K+). However, as will be shown in the analyses, these projected positionings can be confirmed as well as contested by any party in the ensuing interaction. Structurally, an information request and a ‘knowing’ answer form a base adjacency pair in which a sequentially initial first pair-part (FPP) creates a conditional relevance for a specified second pair-part (SPP) (cf. Schegloff 1968, 2007). As will also be seen in the analyses, the base adjacency pair can – and often does – involve various pre, insert and post expansions (Schegloff 2007) which serve the production of knowledge in and through these sequences.

The analysis is organised in three sections, each section containing analyses of extracts which show the different sequential trajectories of epistemic searches that regularly occur in our classroom data. The analyses in the first section describe unproblematic solving of knowledge gaps involving ‘knowing’ responses which fulfil the conditional relevance of the IR and terminate the search. In the second section we present cases where the addressed recipients do

not provide the requested knowledge, and in the third, a case in which the factual correctness of an answer is contested. Taken together, the sections illustrate how different ways of epistemic positioning involve different interactional practices.

Resolving a knowledge gap with a knowing answer

An epistemic search sequence may in its simplest form end when the information that has been requested is provided by the addressed recipient and accepted by the requester. In this case, the speakers will then continue the main activity which the search sequence interrupted. Sometimes, however, a 'knowing' answer provided by the recipient occasions another request by establishing the addressed recipient as knowledgeable regarding the general domain of the knowledge gap. Consider extract 1 in which Inka presents two related information requests to solve a knowledge gap regarding the meaning of a word. Before this, Inka has mistakenly read aloud the word 'dagger' in a somewhat illegible course text, pronouncing it 'dogger', which the two other group members, Sakari and Susanna, have promptly corrected. After two options have emerged as possible candidates for the word that is written in the text, Inka takes a closer look at the text before presenting two information requests, first asking for clarification of which of them in fact is in the text (lines 1-2), and then enquiring after its meaning (line 6).

[EXTRACT 1 NEAR HERE]

Inka's first request for information at lines 1-2 is delivered as an alternative question which, using Finnish, presents two options, 'dagger' and 'dogger', as possible items written in the course text. By leaning close to the text, she marks the knowledge gap as a visual problem. The

request is addressed to both Susanna and Sakari, who prior to this have corrected Inka's pronunciation of the word and who both align with the initiated activity by providing knowing answers in overlap with the request. The answers (lines 3-4) are produced precisely at the point when Inka is projected to utter the 'correct' version of the word 'dagger', although it appears that she restarts the request at line 2 and therefore ends up saying 'dogger' twice. This is oriented to by Sakari who further repeats his knowing answer at line 4 and makes the problem word conform to Finnish morphology by adding a word-final vowel ('daggeri').²

The first information request has now been satisfactorily responded to, as the requested knowledge (that the word is 'dagger', not 'dogger') has been provided by the addressed recipients and accepted as valid by the requester. Although Inka does not produce any sequence-closing acceptance token, she orients to the knowledge gap being satisfactorily resolved by producing a new request which builds on the requested knowledge at line 6. This time, she switches the linguistic code to English to ask about the meaning of 'dagger', addressing the request to both parties by shifting her gaze first to Sakari and then to Susanna. Again, both parties respond: Susanna begins at line 7, but as the answer appears to be perturbed, Sakari provides a synonym for 'daggers' ('knife'), coupled with an embodied stabbing action at line 8. The word 'knife' is taken up by Susanna in her knowledge display of 'dagger', which she constructs by referring to an online fantasy game (*Runescape*) and addresses to Sakari by means of a gaze shift (lines 10-11). By using the computer game in a subsequent account (lines 14, 16) for her knowing of 'dagger', Susanna in effect downplays her epistemic primacy. Such claims to being proficient because of certain out-of-school experiences may be one way for secondary school students to mitigate possible negative perceptions stemming from knowing too much in the classroom.

To sum up, extract 1 demonstrates how students can invite their fellow group members to

address problematic aspects in the pedagogic task. By making a source of the knowledge gap visible (here, the course text) and expressing an ‘unknowing’ (K-) epistemic stance in the form of an information request, the provision of a ‘knowing’ (K+) answer is made relevant. When an answer is provided and accepted, it confirms the projected status of the addressed ‘possible knowers’ as indeed knowledgeable and may therefore pave the way for further requests, that is, ESSs can be ‘chained’ to serve the accumulation of knowledge in a particular domain.

Even though students may be seated in fixed peer groups in the classroom, the configuration of the group does not necessarily correspond to the participation framework of an ESS. Rather, members of a peer-group represent resources which information-requesters may quite readily rely on, but a decision to address a specific recipient may sometimes be based on an assessment of who is a likely ‘possible knower’, i.e. by maintaining what Heritage (2012a) calls an ‘epistemic ticker’. In Extract 2, Alma interrupts her writing task, and, instead of addressing the other group members, requests information related to the causes of the plague from Mauri, who is sitting in the adjacent group, off-camera.

[EXTRACT 2 NEAR HERE]

Moving from an individual activity to the initiation of an ESS, Alma produces a turn-initial change-of-state token *ai*, ‘oh’, (see Heritage 1984; also Kurhila 2006: 57-60), which displays a realization occasioned by her individual activity as opposed to some prior talk. Following this, she both verbally and visually (gaze shift) summons Mauri to secure his participation in the upcoming sequence. After Mauri has signalled his availability (line 3), Alma uses a wh-question format to request information regarding the origin of plague-causing rats at line 4. Notice how little context, from an outsider’s perspective, the formulation of the request appears to provide,

especially as it is delivered ‘out of the blue’; yet on this occasion, for these speakers, ‘the rats’ is heard to refer to those rats that ‘caused’ the plague. A request design which in a different situation might threaten intersubjectivity, here elicits a knowing answer (‘err from India’) at line 5, which, similarly to extract 1, paves the way for another related request, as Alma enquires how the rats were able to travel the long distance (from India to Britain). This time, the requesting turn has the format of an alternative question where the first option is verbalized but the second only projected. The pitch movement and stretching on ‘swimming’, as well as the turn-final *or* index Alma’s weakened commitment as regards the rats’ proposed means of transportation (see Drake 2013: 168-185). Again, the request is responded to with a knowing answer at lines 8-9, where Mauri claims that the rats arrived on boats. Alma treats this answer as sufficient, and begins to disengage from the ESS by shifting her gaze back to her task sheet after Mauri has named ‘boats’ as the carriers for the rats. Keeping her gaze on the task sheet, she closes the search with an acceptance token ‘okay’ at line 10, before Mauri slightly repairs his previous answer regarding the type of boats on which the rats travelled. At line 12, Alma marks the termination of the ESS by visibly and audibly resuming her individual activity, as she begins to vocalize her writing process (cf. Szymanski 1999: 17–19).

In extracts 1 and 2, knowing answers closed the initial knowledge gap and enabled further information requests to be presented by confirming that the addressed recipient, positioned by the questioner as a possible knower, was indeed knowledgeable regarding the domain of the request. The fact that ESSs are chained this way demonstrates that students are attuned to each other’s states of knowledge which they may orient to not only in the course of individual sequences – by e.g. presenting several requests to the same knowledgeable recipient – but also beyond the immediate sequential context. Before extract 2 occurred, Mauri had answered a question on Alma’s request topic, the plague, in whole-class interaction. Such a

public display of knowledgeable ability, at the time validated by the teacher, had established Mauri's epistemic status regarding the matter and may be the reason why Alma selects him to answer her request instead of her own group members: the design of her first request at line 4 indeed treats 'rats' as familiar to both speakers and relevant for the on-going pedagogic activity.

Practices around 'unknowing' responses

Information requests may receive a response turn which claims or displays insufficient knowledge of the information asked for.³ Such responses may be seen as 'non-answers' in the sense that, unlike knowing answers, they are actions which fulfil the technical requirements presented by a FPP information request but they do not further the progress of the information-seeking activity (Heritage and Raymond 2005; Keevallik 2011; Stivers and Robinson 2006: 371). In our data, unknowing answers regularly lead to sequence expansions. Participants rarely abandon an epistemic search after a first non-answer but instead attempt to find other resources to resolve the knowledge gap, e.g. by presenting the request to other speakers, initiating repair to address some trouble in the request, or referring to pedagogic materials. Extract 3 shows how students orient to the obligation of all addressed recipients to display what knowledge they may have regarding the requested item in cases where the first respondent is unable to provide an answer. It involves three students who have been working on a group task of summarising a text and coming up with questions to put to the whole class when Liisa notices a problematic word ('convent') and requests its meaning from the two other group members.

[EXTRACT 3 NEAR HERE]

The three students are attending to their written material when Liisa lifts her gaze and queries the meaning of the word 'convent' at lines 1-2. When delivering the interrogatively formatted request, her gaze is directed between the two other group members, indexing a request that is not addressed to any one speaker to produce an answer but instead makes the recipients' self-selection the relevant next action (see Sacks *et al.* 1974). The next speaker to take a turn is Outi, whose minimal shoulder shrug accomplishes an embodied claim of insufficient knowledge. Such a non-answer leaves the knowledge gap to be resolved, and since Outi's epistemic status regarding 'convents' has now been displayed, it is Aulikki's participation that is required. However, as no response is forthcoming and Aulikki stays focused on her own task well beyond the transition relevance place (TRP), after an approximately two-second pause Liisa begins to pursue a response by summoning her. When Aulikki answers the summons, and thus displays her availability for talk verbally and through a gaze shift (line 7), both Liisa and Outi deliver a newly formatted request (lines 8-9), which explicitly queries Aulikki's epistemic status (*tiiäk sää*, 'd'y know'), treating it as something that should have been produced earlier and is now being pursued as it is still conditionally relevant. Eventually, Aulikki too claims insufficient knowledge by shaking her head, which leaves the knowledge gap unresolved as the sequence terminates.

In extract 3, an information request was addressed to the whole group, and as the first student to take a turn was unable to provide a knowing answer that would resolve the knowledge gap, a response by the second addressed student was expected even if that student was visibly attending to a different activity (of working individually). The evidence for this can be seen in that a) Aulikki is further summoned to produce her answer, b) the second request is qualitatively different from the first request, explicitly enquiring after her epistemic status, and c) is produced nearly simultaneously by both Liisa and Outi, suggesting that both treat the lack of Aulikki's response as pursuable.

Why doesn't Liisa pursue a definition for 'convents' by addressing students outside the group after both available group members have claimed insufficient knowledge? The nature of a knowledge gap may be more or less consequential for the accomplishment of a given pedagogic task. Thus, information pertaining to e.g. crucial aspects of task instruction may be more pursuable than lack of knowledge of a specific word for producing a summary of a text, which can be overcome by reading around the troublesome word, or avoiding it by preparing a question on a different topic for the other students. Furthermore, a termination of a search is not necessarily definite, as speakers can also re-topicalise the knowledge gap at a later stage, which in the case of 'convent' occurs some 45 seconds after the previous sequence is terminated (see line 12). The observation that students may continue the same epistemic search later on suggests that individual epistemic sequences can form 'interactional projects' (Schegloff 2007: 244), i.e. courses of action which can be discontinuous and developed over a longer time span.

Besides eliciting a response from another student after a first non-answer, participants have other practices which they can deploy around unknowing or delayed answers. One regular method involves clarifying how the knowledge gap relates to the pedagogical material. When the addressed recipient does not produce a knowing response to an IR, she can nevertheless display willingness to contribute to the search activity by initiating an insert sequence to determine what aspect of the task the requested knowledge is part of. This aspect of task material as an accountable resource for solving knowledge gaps is demonstrated in Extract 4. In it, Outi encounters a problematic word ('administration') in the course text describing England under George I. She first requests its meaning from Aulikki, who attempts to clarify it in reference to its position in the worksheet. As Aulikki does not provide a knowing answer, Outi moves on to present the request to Tilda, who uses the task to account for her lack of epistemic access.

[EXTRACT 4 NEAR HERE]

After a summons-response pre-sequence (lines 1-2), Outi presents an IR on the meaning of the word 'administration' to Aulikki at line 3, making her response relevant. However, there is a 1.0 second silence before Aulikki shifts her orientation to the course material on her table and initiates an insert sequence to request information about the location of the problematic word in the worksheet (lines 5-6). When Outi responds that it is in section B, Aulikki continues looking at the worksheet for about five seconds before claiming insufficient knowledge of the problem word at line 9. As opposed to extract 3, Aulikki does interactional work to provide an answer by enlisting Outi's help to locate the knowledge gap in the worksheet. After this, Outi re-directs her request to a new possible knower, Tilda (lines 10-11).⁴ This request presupposes Tilda to have been following the request presented to Aulikki, as 'administration' is now referred to with the pronoun *se*, ('it'). Such reference turns out not to be part of the shared epistemic territory but becomes established as such through a repair sequence (lines 12-13). Tilda then claims insufficient knowledge, and accounts for it by not having progressed far enough with the task.

The responses in Extract 4 by Aulikki and Tilda rely on the same physical artefact, the worksheet, to construct two different ways of attending to the lack of a knowing response. The insert sequence initiated by Aulikki illustrates how speakers may attempt to work out a sufficient answer for all practical purposes by clarifying and re-examining the immediate context of the knowledge gap. At the same time, doing a display of 'checking the text' legitimizes insufficient knowledge and non-understanding by conveying that the recipient has at least 'given it a try'. The same property of the pedagogic material as a source of knowledge is oriented to in Tilda's claim of insufficient knowledge, which she accounts for by stating that she has not yet progressed that far in the task. The implication is that if she had got far enough with the task, she

would be expected to know what 'administration' is – however, unlike Aulikki, she does not go out of her way to do a display of checking the text.

This section has described recurring practices around 'unknowing', and therefore dispreferred, responses given to information requests in ESSs. These responding actions range from standalone minimal displays – both verbal and embodied – of unknowing epistemic status to accounting for the lack of epistemic access and displaying willingness to contribute to solving the knowledge gap. Seen this way, the response turn is a locus for re-negotiation work on a) the positioning by the IR of the addressed recipient as knowledgeable, and b) their degree of moral responsibility to participate in the epistemic search. Some recipient actions, such as checking the course text, are more collaborative than others, and thereby assume more responsibility for retrieving the missing knowledge than unaccounted claims of not knowing (see also Keevallik 2011).

Contesting 'knowing' responses

Presenting an information request to a recipient displays an orientation to that recipient as someone who may be able to provide the missing information. The addressed recipient may, however, turn out to display a more or less knowing epistemic stance regarding the object of knowledge being requested, as shown in the previous sections. Whenever the recipient displays or claims to know an answer to the IR, the participants are faced with the task of deciding whether that response is in fact 'correct'. Most of the time, this interactional task may go unnoticed, as in extracts 1 and 2 in which the requesters accepted knowing answers as unproblematic by presenting further requests and eventually continuing the activity which had occasioned the knowledge gap in the first place.

However, negotiation of the veridicality of an answer becomes more visible when the sequentially third turn is used by the requester to disagree with the proffered K+ positioned (Heritage 2012b) response. This regularly leads to sequence expansions as the speakers will need to rely on further resources to decide the validity of the answer. This can be seen in Extract 5, in which Aulikki requests information on how to spell the word ‘marriage’ but does not accept Outi’s response immediately and asks the teacher for a second opinion before treating the matter as solved.

[EXTRACT 5 NEAR HERE]

A knowledge gap is made visible when Aulikki requests information on the correct spelling of the word ‘marriage’ at line 1, using a Finnish wh-question format and a more or less standard British English pronunciation of the target word. At line 2, Outi begins to answer with what appears to be the beginning of a straightforward, *no-trouble noun phrase* (Fox and Thompson: 2010), which she repairs by cutting off and beginning a new answer using negative interrogative syntax, thus epistemically downgrading her response.⁵ Simultaneously, Aulikki also adds to her request a candidate answer in overlap with Outi at line 3, which effectively changes the request to a polar question. Once in the clear, Outi asserts her answer using the practice of pronouncing the referent word spelling as if it followed the conventions of Finnish orthography, which relatively consistently reflects the phonemes of the language (see e.g. Iivonen 2009). This not only involves exploiting cross-language differences in phoneme quality (e.g. using [ɑ] at lines 2-3 instead of [æ] for indicating the first vowel of the word as ‘a’) but also those related to quantity, so that Outi’s lengthened [r:] signals two ‘r’s’.

By the end of line 3, two different spellings for the word 'marriage' have been put forward. This is followed by a trouble-projecting 1.5 second silence after which Aulikki contests Outi's suggestion in a creaky voice at line 5. She marks it as unexpected by using the Finnish *ai*, 'oh', as a news marker (see Sorjonen 2001; Kurhila 2006: 57-60) as well as repeating the verb used in Outi's prior clausal response. Outi responds to this by further downgrading her epistemic stance from an assertion of information at line 2 to claiming insufficient knowledge at line 7. This she does by using the particle *eiku*, which can be used as a lexical device to project the beginning of self-repair (see Sorjonen and Laakso 2005: 251), but which here repairs the epistemics of Outi's previous turn by replacing her previous stance with a new one. So, by the end of line 7 two candidate spellings for 'marriage' have been proposed, but Outi has epistemically 'backed down' and left Aulikki with her own candidate answer. At line 9, Aulikki orients to solving this uncertainty by soliciting the teacher, who has been going round the classroom and, having approached the group has made herself available at line 8. Notice how she uses the same word-spelling practice as the two students to validate Outi's original suggestion at line 10. Outi's retrospective claim to knowing the word, addressed to Aulikki, explicitly directs her attention to the ratification of Outi's earlier epistemic supremacy using the particle *kato* as an attention-seeking device (cf. Hakulinen and Seppänen 1992).

In summary, participation in an epistemic search involves the speakers positioning themselves and others with regard to the targeted knowledge. However, these claims to a specific distribution of knowledge between the speakers are subject to re-negotiation at any time during the epistemic search. As illustrated in Extract 5, this may take the form of the requester repairing their epistemic stance by adding an incremental candidate answer to the request (line 3), contesting the correctness of the offered response (line 5), or seeking further resources to ratify it (line 9). Similarly, 'knowing' participants may downgrade the epistemics of their responses (line

7) as well as make retrospective claims to knowledge (line 11).

DISCUSSION

In this article, we have examined the interactional management of knowledge in epistemic search sequences (ESSs) through which students work on knowledge gaps in groups in a content-based language classroom. We have shown how students working on pedagogic tasks discover knowledge gaps related to the task and initiate interactional sequences to resolve them. They do this by co-ordinating linguistic, embodied and artefactual resources to negotiate what they and their peers know and don't know about the targeted information, as well as their responsibilities for knowing or not knowing it. Our main findings can be summarized in three main points: the distinct interactional properties and affordances of epistemic work in peer interaction as opposed to teacher-led sequences; the management of accountability for knowing or not knowing; the emergent quality of knowledge gaps or 'learnables'.

The analyses show that displaying a K- epistemic stance in the classroom is a subtly different affair when it is done in an IR by a student in peer interaction from when it is built into a response to a teacher's question as a 'claim of insufficient knowledge' (cf. Sert 2011, Sert and Walsh 2012). Besides occupying a different position in a sequence, (i.e. FPP vs. SPP), another crucial difference relates to the notion of congruence between epistemic status and stance (Heritage 2012a: 33) in the first pair-part turns in these sequences. That is, students who make IRs are treated as having a K- epistemic status as regards the information sought, as opposed to teachers' 'known-answer' or 'display' questions in which a K- epistemic stance indexed by turn design does not match the epistemic status of the speaker (Mehan 1979). In this regard, student-initiated ESSs are used for resolving emergent knowledge gaps, unlike 'known-answer' whole-

class sequences, which are ways of producing and publicly ratifying knowledge related to teacher-defined learning objects. Both of these points have important consequences for the epistemic rights and responsibilities displayed and oriented to by participants. By initiating an ESS through producing an IR, a student takes on responsibility for the resolution of the knowledge gap by, for example, enlisting the help of other participants when met with K-responses (extract 3), or adjudicating on the correctness of responses (extract 5). In terms of congruence between epistemic stance and status, addressed recipients, by treating the producer of the IR as K- in the targeted domain, can collaborate in the interactional work necessary for resolving the knowledge gap by joining in with the original requester in soliciting information (extract 3) or by locating the problem (extract 4). These epistemic actions provide affordances for and involve different processes of learning from participation in teacher-led known-answer sequences in whole-class interaction.

Requesting information from peers involves placing them in the position of potential knowers, and, if the recipients comply with this epistemic positioning, the analyses show that they are likely to be held accountable for what they claim to know, or not know, in a qualitatively different manner to when responding to questions by the teacher. Besides using worksheets to account for 'not knowing' (extract 4), this can be seen in the data in the ways in which, 'knowing' recipients may downplay their epistemic access to mitigate possible negative perceptions (extract 1), be treated by others as having K+ status on a knowledge domain from having displayed such knowledge in a previous interaction (extract 2), or retrospectively insist on their knowing after being 'proved right' by the teacher (extract 5).

Our findings also indicate that knowledge gaps, or 'learnables' (Majlesi and Broth 2012), are not necessarily the same as those learning objects identified by the teacher's agenda or the curriculum. Similar observations concerning the difference between intended and actual

pedagogy have been made by Seedhouse (2005). The analysed sequences show that, in doing content-oriented tasks in which no language point has been pre-selected for instructional attention, language is likely to become a focus of talk ‘at point of need’, whether in the form of an unknown word in a text which is needed for a task, or unfamiliarity with a spelling of a known word to be used in an essay, etc. These knowledge gaps are unpredictable, as they are discovered by participants, and vary across students even in a single classroom. Thus, when students are responsible for the interactional management of knowledge, they can exercise agency by discovering, or recovering, for themselves their own ‘learnables’, and deploy a wide range of resources in working on them.

This article is an initial contribution to what could be a promising line of research on L2 pedagogic interaction from a broadly CA institutional interaction perspective. It has been well established in recent CA studies on the epistemics of everyday interaction that the management of rights and responsibilities regarding knowledge is key to understanding issues of cooperation, affiliation and sociality in human interaction (Stivers *et al.* 2011a; Heritage 2012a,b). L2 classrooms, like all classrooms, are interactional settings in which knowing and coming to know something is the official business, and are thus inevitably sites where epistemic rights and responsibilities are brought into sharp relief for the construction of learning. Language learning initiatives such as CLIL are not only justified by advocates in terms of what students are expected to come to know in terms of content or language curricular outcomes, but, perhaps just as importantly, by the classroom communication processes in which they *use* sets of linguistic, embodied and artefactual resources to achieve these outcomes. This article has sought to show that whatever the pedagogic prescriptions for content and language integration, much can be learned by focusing on how participants themselves discover objects of learning, whether ‘content’ or ‘language’, and on how they work together to manage issues relating to knowledge.

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¹ The dataset was collected jointly by institute X and the Department of Y, University of Z during 2010-2011. It consists of 16 history lessons, each lasting 55 minutes, taught through English as an elective eight-week module to students registered in the Content and Language Integrated (CLIL) programme of the school. The names of the speakers have been anonymized.

² See Kurhila (2006: 111-117) for how the practice of fennicizing foreign-language words may be used in NNS-NS conversations for making unknown referents identifiable and subject to the approval of native Finnish speakers. Here, the context differs insofar as the students are all native Finnish speakers, and Sakari's fennicized version of 'dagger' is not produced as a candidate word (e.g. by means of soft voice, etc.) but is quite affirmatively uttered. Rather, the turn is hearable as a somewhat humorous comment presented in a particular community whose speakers have access to both Finnish and English, similar to the observations made by Mori and Hasegawa (2009: 85-88) related to Japanese FL classrooms.

³ On the difference between demonstrating and claiming understanding see Sacks (1992) and Koole (2010).

⁴ Notice how here, as opposed to extract 3 where the first request was addressed to the whole group, a response from other members is not conditionally relevant, but needs to be re-directed (in this case to Tilda).

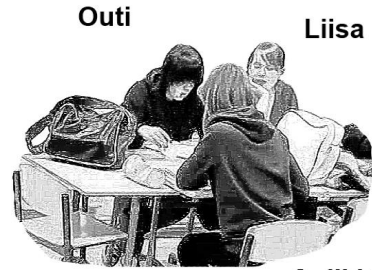
⁵ See Koshik (2002: 1856-7) and Heritage (2012b, 18) for an example how speakers may back down from possible disagreement by weakening their epistemic stance. Conversely, turns can also be epistemically upgraded, as illustrated in Schegloff (1996: 80-81).

Extract 2. Rats.

01 Alma -> ai, (.) Mauri?
oh, Mauri
{SHIFTS GAZE FROM DESK TO MAURI
02 (1.2)
03 Mauri °hnm°
04 Alma -> where did the rats °<come>°
05 Mauri -> err (.) from India
06 (1.8)
07 Alma <like swim↑mi:::ng o[::r,>
08 Mauri [no (.) in a boat
09 you know, (.) a banana boat
{ALMA SHIFTS GAZE TO HER DESK
10 Alma o<kay>
11 Mauri well not really a banana boat but
12 Alma <came o:n> ((BEGINS TO WRITE))



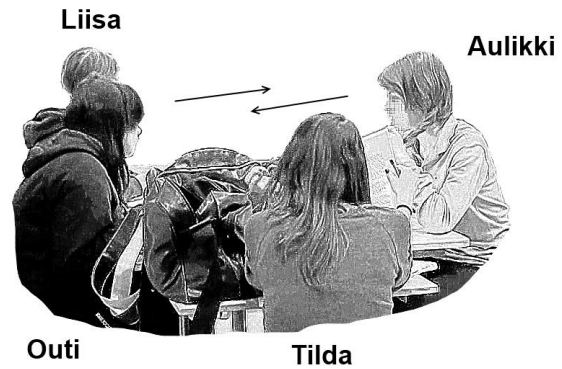
Extract 3. Convents.



- 01 Liisa LIFTS GAZE FROM HER DESK
- 02 ->
 †mikä o convent
 what be-3SG convent
 what is a convent
 {TURNS GAZE BETWEEN AULIKKI AND OUTI}
- 03 (0.8)
- 04 Outi LIFTS LEFT SHOULDER AND TURNS HEAD SLIGHTLY TO LEFT
- 05 -> (2.0)
- 06 Liisa -> Aulikki?
- 07 Aulikki °häh°
 PRT
 °huh°
 {GAZE TOWARDS LIISA}
- 08 Liisa -> tiiäk sää (mi[kä xx o) convents
 know-2SG-Q you what xx be-3SG convents
 d'y know what xx is convents
- 09 Outi -> [*>*tiäksä mikä o< convents
 know-2SG-Q you what be-3SG convents
 d'y know what convents are
- 10 Aulikki SHAKES HEAD AND TURNS BACK TO HER TEXT
- 11 ((45 SECONDS REMOVED))
- 12 Outi -> mut ku h- †mikä o convents
 but PRT what be-3SG convents
 but like- what is convents
- 13 Aulikki emmää tiiä mikä o abolished
 NEG-1SG-I know what be-3SG abolished
 I dunno what's abolished



Extract 4. Administration.



01 Outi Aulikki

02 Aulikki häh
PRT
huh
{GAZE TO OUTI}

03 Outi -> mikä o administration
what be-3SG administration
what's administration

04 -> (1.0)

05 Aulikki-> SHIFTS GAZE TO HER PAPERS ON THE DESK

06 missä se lukee
where it read-3SG
where is it

07 Outi tässä beessä,
here B-INE
here in B (task item)

08 (5.0) /A EXAMINES HER WORKSHEET; OUTI MAINTAINS GAZE AT HER

09 Aulikki-> emmää tiiä
NEG-1SG-I know
I dunno

10 Outi -> SHIFTS GAZE AND TURNS TOWARDS TILDA

11 Tilda mikä se o
[NAME] what it be-3SG
Tilda what is it

12 Tilda (ai mikä)
PRT what
oh what

13 Outi administration

14 Tilda -> emmää tiiä mää en oo vielä siinä (asti)
NEG-1SG-I know I NEG be yet 3SG-INE as far
I dunno I'm not that far yet



Extract 5. Marriage.¹

01 Aulikki -> ↑mite /mæɪɪdʒ/ kirjotetaan
how marriage write-PASS-4
how do you spell marriage

02 Outi -> /mä/ (.) [eik se oo-] (.) </mar:iage/>
NEG-Q-it be /mar:iage/
isn't it /mar:iage/

03 Aulikki [/m α r ɪ dʒe/

04 (1.5)

05 Aulikki-> (ai o) ((CREAKY VOICE))
PRT be-3SG
oh is it

06 (1.0)

07 Outi -> ei ku emmää tiiä
no since NEG-1SG-I know
no I mean I dunno

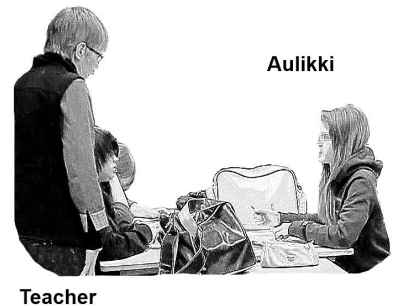
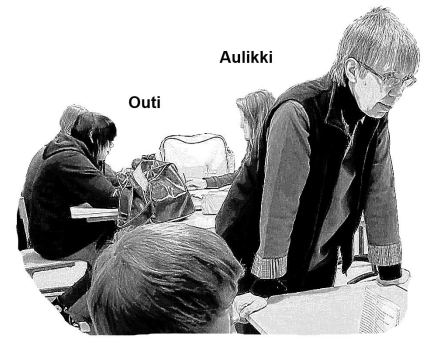
08 T okay ((COMES NEAR THE GROUP))

09 Aulikki ↑how we write /mæɪɪdʒ/
err </mar:iage/>

10 T

11 Outi -> kato määh osasin

12 PRT I can-PST-1SG
look I knew



1 To more accurately describe the participants' pronunciation of the word 'marriage', which is key to understanding their actions in this extract, we have used IPA transcription for it, separated from the Jeffersonian transcript with forward slashes (/). During the sequence, two allophones of 'r' are used in the word 'marriage'; at lines 1 and 9 is an alveolar approximant, represented as [ɹ] in IPA transcription, as opposed to an alveolar trill [r], which is employed in two different lengths in later utterances of this transcript to mark the practice of 'doing English spelling using Finnish' (see Iivonen, 2009, for a description of phonetic features of Finnish).

APPENDIX. TRANSCRIPTION SYMBOLS.

wo::rd	prolonged sound
(.)	silence less than 0.2 seconds
(2.0)	duration of a silence
(word)	uncertain transcription
wo-	cut-off
[]	overlapping talk
{CAPS	embodied actions and their placement relative to talk
<word>	slower pace than in surrounding talk
°word°	quieter than surrounding talk
//	phonetic transcription
,	continuing intonation
?	rising intonation at the end of a prosodic entity
↑↓	change in pitch height
<i>italics</i>	English translation of a Finnish turn constructional unit