

Mapping Asynchronous Forum-based Interaction Patterns between Second Language Educational Researchers and Practitioners

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Abstract—This paper presents a detailed mapping of the interaction patterns and level of cognitive processing that characterised online communication between educational researchers and L2 teachers during six weeks of asynchronous forum-based discussions of six research articles. The project was designed to investigate and ultimately bridge the linkage gap between researchers and practitioners, following the Graham et al (2006) knowledge to action framework. We used NodeXL to map the different types of interaction patterns (user-to-user and user-to-thread) and adapted the Hara et al (2000) framework to identify and describe the level of social cues used and cognitive processing mechanisms evident in the participants' texts. The findings showed little direct interaction between the two groups as evidenced by the low use of social clues and reluctance of practitioners to respond directly to the researchers. On the other hand, the mapping of the user-to-thread patterns showed clustering around some discussion topics that were raised by both researchers and practitioners, which suggests that the discussion was meaningful and co-constructed by members of both groups. The exchange of ideas in the forum space seemed to transcend issues of identity and conventional roles as it allowed both groups to be equal contributors to the dialogue. Moreover, there was clear evidence of in-depth cognitive processing in the messages of both groups. We propose that, in spite of the seeming guarded distance and practitioners' reluctance to address researchers directly, the forum facilitated knowledge exchange and meaningful discussion of issues of interest to both groups.

Index Terms—linkage gap, asynchronous communication, interaction mapping

I. INTRODUCTION

The present paper reports on one aspect of a multi-stage project that aimed to investigate the linkage gap between L2 educational researchers and practitioners. The project was the result of a collaboration between the Canadian Association of Second Language Teachers (CASLT), the Canadian Modern Language Review and the second author, who partnered to facilitate the creation of a common virtual space where researchers and novice practitioners could 'meet' and discuss six research articles authored by the participating academics. To facilitate this knowledge mobilization effort, the project design was a step-by-step implementation of Graham et al's (2006) Knowledge to Action framework that also afforded data collection about the behaviours and ideational and linguistic choices of the two groups (see Knouzi & Mady, 2015). Previous analyses of the different aspects of the project data yielded mixed results. On the one hand, comparison of pre- and post- discussion interviews with the participating novice teachers showed the teachers gained some awareness of the main statements made in the articles that were discussed (Mady, 2013). However, we noted that both groups' participation in the forum discussions were limited and reserved (Mady, 2012; Mady & Knouzi, 2015). Therefore, in this paper we analyze the interaction patterns, the social cues, and the level of cognitive processing that was evident in the exchange of ideas between the two groups. Specifically, the paper aims to answer two questions: (a) What is the structure of communication between a group of researchers and a group of novice teachers who were tasked to discuss six published articles written by the participating researchers, and (b) what is the level of cognitive effort engaged during the discussions. We believe that the answers to these questions might help explain the mixed results we have obtained so far and, in so doing, pinpoint the cause of such discrepancies.

A. Definition, Causes and Repercussions of the Linkage Gap

Several fields and disciplines have reported linkage gaps between their scholars and researchers on one hand and their practitioners on the other hand. A linkage gap can be defined as a lack or breakage of communication between researchers and practitioners which hinders or delays the exchange of information between the two groups to the detriment of the development of the discipline and the interests of the public. This has been a pressing concern for the fields of healthcare and medicine, for instance, where there is an obvious urgency to translate new empirical evidence into actionable messages that can, in turn, inform decision-making and transform practice for the benefit of patients

(e.g., Lavis et al (2003), refs). However, there is ample evidence that the knowledge-to-action process is hindered by different kinds of systemic obstacles.

The fields of education, in general, and second language education in particular have been the site of a linkage gap comparable to the one observed in the healthcare system (Davies, 2000; Hargreaves, 1997; Hemsley-Brown, 2004; Hess, 2007; Lagemann, 2002; Levin and Cooper, 2010; Mollica, Philips & Smith, 2005; Smylie and Corcoran, 2009). The causes of the gap have been described as conceptual, institutional, and attitudinal.

At the conceptual level, there is evidence that researchers and teachers read and assess the value of published work differently. Researchers measure the value of any work in terms of the contribution it makes to the field and how it augments, builds on or rectifies previous knowledge. Teachers, on the other hand, seek recommendations for best practices that are transparent and applicable (e.g., Bartels, 2003; Ellis, 2001).

The institutional and attitudinal obstacles are often related to what have been perceived as ‘typical’ roles and responsibilities associated with the two groups. It is not clear whether these roles were first imposed as institutional norms and then became internalised as attitudes or the other way around (cf., Cochran-Smith & Lytle, 1999; Herrenkohl, Kawasaki & Dewater, 2010). Allison and Carey (2007) speak of a hierarchy where the knowledge transfer process is unidirectional emanating from the research sphere to the field practitioners. Cooper (2010) and Davies (2000) speak of two different cultures characterized by the use of different registers and the pursuit of different agendas. Rickson (2005) explains that while, the two groups share the same fundamental concerns related to the understanding of learning processes and the identification and verification of best teaching practices, their problem-solving and knowledge dissemination processes divert considerably in accordance with their respective institutional expectations: researchers value data-driven investigation and prioritize publication while teachers are more likely to share insights gained from classroom experience within their community of practice.

The linkage gap can have detrimental consequences for both research and practice. It breaks the necessary feedback loop that connects and informs both spheres. Without this feedback loop researchers lose touch with the lived reality and immediate concerns of practitioners and teachers miss valuable current information that can revolutionize their practices. The present paper contributes to the ongoing debate about the causes and ways of closing the linkage gap between educational researchers and practitioners.

B. The Project Rationale

The multi-staged project from which this paper is derived is based on the Knowledge-To-Action (KTA) conceptual framework developed by Graham et al. (2006) who defined the framework as a tool that “integrates the roles of knowledge creation and knowledge application.” (p. 13). The framework includes seven interrelated components, and evolves in a cyclic manner allowing mechanisms for assessment and revisions within and following each component. Figure 1 below illustrates how we operationalized each of the seven KTA components including the specific steps we took during this project to bridge the gap between educational researchers and practitioners with the view to facilitating knowledge exchange.

While the Figure itself seems linear, it is important to emphasize that the KTA framework depicts a cyclic continuous process that relies on the intervention and collaboration of several stakeholders and not a linear activity. Two principles guided our reading and implementation of the Graham et al. model. First, all project components and phases aimed to facilitate an *exchange* of knowledge between the researchers and the practitioners. A special attention was made not to suppose or consecrate a hierarchy between the two groups. While acknowledging that the two groups represented two distinct communities with different discourses and agendas, we believed that they both had knowledge capital to contribute, and therefore strove to create the necessary conditions for a balanced and rich *dialogue*.

Second, we conceptualised the project as both an attempt to implement the KTA framework in an education context and a research study and data collection strategy about the behaviours of the two groups. The KTA implementation part of the project included a phase of ‘barrier identification’ whereby we consulted both the literature and pertinent stakeholders to help define the barriers to knowledge exchange between researchers and practitioners in the field of education. This consultation helped us identify (a) the lack of a shared space, (b) the often obscure and exclusive language of published research, and (c) physical inaccessibility to relevant, high quality research as three main barriers that hinder the KTA process in education. This step led, in turn, to the creation of tools and artefacts to surmount these obstacles as described below (study guides, online forum). On the other hand, the research study part aimed to collect concrete thick data from the resulting interaction between researchers and teachers in order to analyze it and gain a better understanding of any further barriers that may not have been identified before.

As shown in Figure 1, for the first phase of the project, we consulted researchers, faculty, and administrators to identify six published research articles that subsequently became the common reference of the dialogue between researchers and practitioners. Our advisors were highly qualified and knowledgeable educators, which added validity to our selection of pertinent forms of knowledge. The six articles were also published in a prestigious peer-reviewed journal, and have therefore been through a rigorous vetting process of review and revision.

In the second phase of the project, we obtained the permission of the authors of the six articles to use their articles and their agreement to discuss their work with a group of teachers and teacher candidates that were also participants in the project. The journal also granted our teacher participants free access to the articles during the project.

The implementation phases (phases 3 and 4 in Figure 1), geared towards overcoming the three obstacles identified above, consisted in (a) granting the novice teachers free and direct access to quality relevant research and the authors behind it, (b) writing support guides that situated each article in the larger related literature, summarized, and explicated each article in more accessible language, and (c) creating a virtual space where practitioners and authors could interact freely for a week each time to discuss the article of the guest author of the week. In this regard, to use Graham et al.'s terms, we went beyond diffusion and aimed for dissemination as we made published material accessible and meaningful to the novice practitioners. During the project, the second author acted as moderator but limited her interventions to providing technical support when needed. For instance, during two weeks, she had to relay the researchers' responses to the forum because the researchers were unable to log in and post their messages directly to the forum.

The project design also facilitated the observation and monitoring of researcher-teacher interaction through the analysis of forum-log files, interaction patterns, and the texts created by the two groups while discussing the weekly articles. In previous papers, we explored different aspects of the interaction in an attempt to understand its scope and direction. In fact in Mady (2012), Google analytics data was used to measure the number and duration of participant visits to the forum and the kinds of resources most used (study guides, videos). In Knouzi and Mady (2015) we used a text analysis approach to examine the ideational and linguistic choices made by the two groups during their direct interactions. In this article, we further investigate the extent of knowledge exchange and uptake during the dialogue by mapping the interaction patterns across the six weeks, and analyzing the presence and type of cognitive skills and level of cognitive processing as exemplified in the conversations of weeks 3 and 4, the two most active weeks during the project.

Graham et al. consider the seventh phase part of a necessary 'feedback loop' that evaluates, improves, and builds on different actions to ensure sustainability of knowledge use. We consider that making our project data and findings available to the broader community contributes to the feedback loop as it may enhance and guide further efforts to bridge the linkage gap in the educational field.

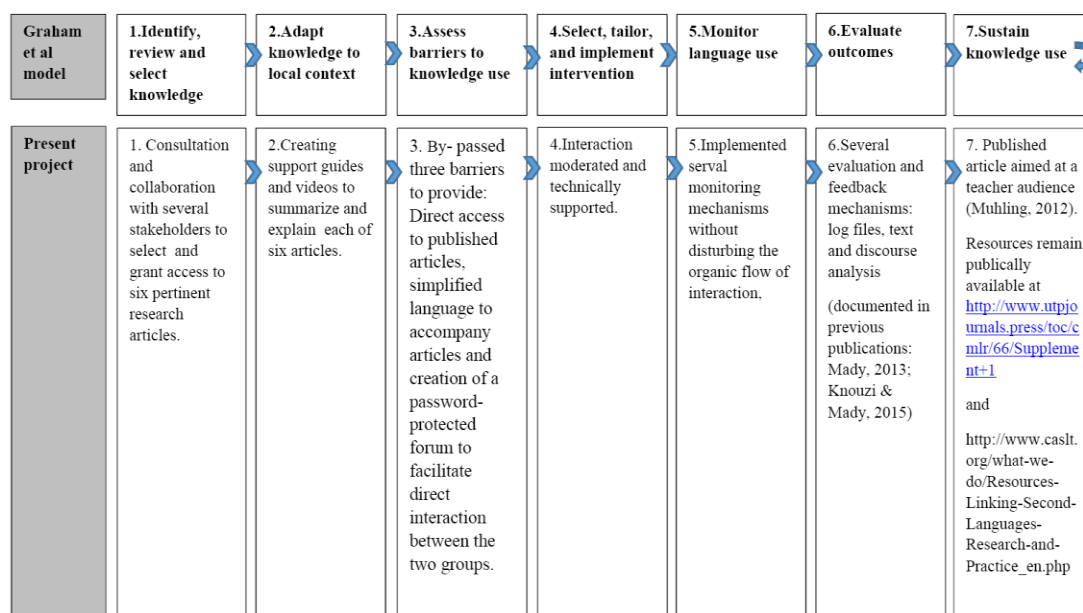


Figure 1: Project design and implementation of Graham et al. (2006) KTA framework

C. The Forum as a Potential Social Network

Underlying the design and set up of the forum was the expectation that the creation of an open virtual space that brings the two groups in contact with each other will help transcend the differences in their discourses. In other words, one of the major intended aspects of the forum was the creation of 'social relationships' between members of the two groups, or a social network that can promote collaboration and a meaningful exchange of ideas. In this regard, Abbasi and Altmann (2010) argue that scientific collaborations 'emerge from, and are often perpetuated through, social networks' (p. 3). They acknowledge that, to a large extent, the success and failure of interaction within any given social network have a major impact on the success or failure of the broader communication situation. There is, therefore, a growing consensus on the value of mapping and analysing the social networks that underlie collaborative endeavours.

Blanchet and James (2012) define social network analysis as 'a distinctive set of methods for mapping, measuring and analysing the social relationship between people, groups and organizations' (p.439). The scale of the network can vary greatly ranging from a closed set of interactions to an open platform with unlimited boundaries. However, all attempts for analyzing such networks include a form of graphic representation of the relationships between the different

actors in a network, by representing a participant as a node and the relationship between entities as ties (Abbasi & Altmann, 2010; Blanchet & James, 2012).

Several mapping tools are being used in the field. For this study, given the limited number of participants and of the ties between them, we used NodeXL and entered the interaction data manually. This analysis allowed us to define and then visualise different types of ties between the participants.

II. METHODS

A. Context of the Study

CASLT invited the second author to design and conduct a research project that aims to bridge the gap between educational researchers and practitioners. As explained above, the proposed design was based on the Graham et al. framework which called for the intervention of several stakeholders. In fact, participants were recruited through calls for participation distributed on the CASLT website, at L2 teachers' conferences, and to teacher candidates in one Faculty of Education in Ontario. Several educators and researchers helped select the papers that eventually constituted the main reference for the forum discussions. The Canadian Modern Language Review granted free access to the selected articles to all participants for the duration of the project. The second author designed and moderated the online environment.

B. Participants

The 8 researcher participants in this project were renowned researchers in the fields of second language acquisition, teaching, and learning. They were also teaching professors at the graduate and undergraduate levels in their countries (Canada, Hong Kong, New Zealand, and USA). They accepted to discuss their respective papers with the practitioner participants during the week in which the paper would be featured on the forum.

The practitioner group included teachers ($n=9$) who were recruited through distribution of project information at conferences and teacher candidates ($n=35$) who were enrolled in an FSL teacher education program. For these teacher candidates, participation in the forum discussions was part of their course assignments.

Eventually, in addition to the eight researchers, 52 teacher/teacher candidate (T/TC) participants had access to the password-protected forum: 34 contributed to the discussion forum, the majority ($n=25$) of whom were TCs. The researchers posted 17 messages while the T/TCs posted 103 messages for a total of 122 messages posted over 6 weeks. The participants posted in French ($n=107$) and English ($n=15$).

C. Research Questions

- 1- What is the structure of communication between the two groups?
- 2- What is the level of cognitive effort engaged during these discussions?

D. Analysis Procedure

The data analysis proceeded in two stages. In the first stage, we used NodeXL Template for Microsoft Excel 2007 to map the pattern of interaction between researchers and T/TCs every week. NodeXL is an open access tool that can be used to map asynchronous threaded conversation. Typical threaded conversation forums allow users to respond directly to a particular message: a user can post her message in response to a previous message by clicking 'reply' or choose to start a new thread by posting an independent message. The implicit ties between thread and users or 'reply networks' can be represented graphically with NodeXL, which in turn reveals the structure and patterns of communication within the forum, the most active users, the most popular topics, where interaction was dense and where it failed.

The forum created for the project did not allow for direct replies. Messages were posted in sequence with each message bearing the electronic ID of the writer. Some users addressed their messages to specific recipients in the body of the message usually as a greeting form (e.g. Hi Steph, I agree [...]). Other messages did not indicate the name of specific recipients but were clearly intended as a contribution to an ongoing thread or a topic raised in previous messages. This configuration did not allow for the automatic tracking of 'reply networks'. We, therefore, entered all the available data manually.

We generated two maps for each week, a user-to-user map and a user-to-thread map. For the user-to-user map, we entered the names of the users (represented as nodes or vertices) and whether they addressed their message to a specific person in the forum, and if yes, we entered the name of the intended recipient. The resulting map showed (a) floating nodes that represented users who posted messages with no specific recipient and (b) connected nodes linked by pointed arrows that show the direction of the communication from the writer to the recipient of the message.

For the user-to-thread map, we linked the names of users to the themes they were addressing in their message, regardless of whether it was addressed to a recipient or not. The map shows the number of users who commented on any given topic. It is to be noted that the list of the themes or topics that constituted the threads were identified and coded in a first stage of the project and documented in a previous paper (Knouzi & Mady, 2015).

In the second stage, we analysed the forum messages qualitatively by looking at the level of cognitive processing and the types of cognitive skills used during the conversations of weeks 3 and 4 which were the most active weeks in terms of the number of total messages posted. The conversations in weeks 3 and 4 exemplified some of the most pertinent

findings from the interaction mapping stage. In fact, in both weeks, the interaction was characterized by a one-way dialogue from researcher to T/TC with no answers or feedback in the opposite direction. On the other side, there were some clusters around some themes or topics that were raised during those weeks. The qualitative analysis allowed us to look closely at these two conversations in terms of the social and cognitive mechanisms engaged by the two groups.

Specifically, we used Hara, Bond and Angeli's (2000) model to code forum messages in terms of social cues used, and the level of cognitive processing evident in each message. Hara et al. explain that their model includes both a numeric analysis and a targeted and detailed content analysis of an online discussion to provide a comprehensive picture of the richness, scope and content of the conversation. The model revises and improves the widely used model of Henri (1992) which, while comprehensive, was somewhat ambiguous and led to low scoring reliability because of ill-defined codes and coding procedures (Hara et al., 2000; Howell-Richardson & Mellar, 1996). Following Hara et al. (2000), we counted the total number of messages and the average length of messages posted by researchers and T/TC participants each week. We used the paragraph as our basic coding unit considering that, like Hara et al's participants, our participants were able to write well-structured paragraphs with a main idea unit per paragraph. We coded for 3 of the 5 dimensions of the Hara et al model.

Social cues: We adopted Henri's (1992)/Hara et al (2000) definition of social cues as "statement or part of a statement not related to formal content of subject matter" (p. 126) and thus coded instances of self-introduction, expressions of feelings, closures, jokes, and compliments to others as social cues. Within closure, we included name signature because we considered that in the case of the forum where writers are automatically identified by their sign-in names, the addition of a personal signature indicated a different level of social presence. We carried this analysis on all the data set, while the following analysis was only applied to weeks 3 and 4.

Depth of cognitive processing: Hara et al (2000) distinguish between surface-level processing which includes factors such as "making judgment without justification, stating that one shares ideas or opinions already stated, repeating what has been said, and asking irrelevant questions" and in-depth processing which includes linking facts and ideas, offering new elements of information, discussing advantages and disadvantages of a situation, and making judgements that were supported by examples and/or justification" (p.126). We followed Hara et al' recommendation to code whole messages (not individual paragraphs) at this level. Messages that included instance of both surface-level and in-depth processing were coded as both.

Table 1 shows the coding scheme we used.

TABLE I.
CODING SCHEME ADAPTED FROM HARA ET AL. (2000)

Social cues
Self-introduction
Expression of feeling
Greeting
Closure/signature
Jokes
Emoticons
Compliments to others
Level of cognitive processing
Surface-level processing
Making judgment without justification
Stating that one shares ideas/opinions already stated
Repeating what has been said
Asking irrelevant questions
In-depth processing
Linking facts and ideas
Offering new elements
Discussing advantages and disadvantages
Supporting judgment with examples and justifications

Note: Adopted from Hara et al (2001) with some modifications.

III. FINDINGS

A. Interaction Patterns

TABLE II.
NUMBER AND LENGTH OF MESSAGES POSTED BY RESEARCHERS AND T/TC

	Researchers			T/TC				Total Number of messages	
	Number of messages	Shortest message	Longest message	Average message length	Number of TC messages	Shortest message	Longest message		Average message length
Week 1	2	28	132	80	4	172	348	282.5	6
Week 2	2	214	297	255.5	10	132	439	346.5	12
Week 3	6	37	433	249.5	25	156	598	309.5	31
Week 4	1	-	-	605	23	128	545	333.5	24
Week 5	5	83	243	237	16	106	653	316.5	21
Week 6	1	-	-	431	25	98	476	254	26
Total	17				103				120

Table 2 shows the number and average length of messages posted by the researchers and T/TC every week. It shows that the T/TC posted 103 messages in total while the researchers posted 17 messages only. The dominance of the T/TC presence was consistent from week to week. The T/TC messages were also considerably longer than those posted by the researchers- with the exception of the single message posted by the guest researcher on Week 6. It is also to be noted that each T/TC posted one single message per week. In fact, these participants were required to post at least one message per week as part of the course work.

Figure 2 represents the user-to-user interaction maps for the 6 weeks. Each dot on the maps represents a message posted by a T/TC. Triangles represent messages posted by a researcher. Arrows linking two messages indicate that a message was written as a response to another participant's message. For instance, in Week 1, one T/TC addressed the researcher in her message (arrow pointing from T/TC message to researcher) and there was an exchange between the researcher and one T/TC where the T/TC addressed the researcher who then responded to the T/TC (double-headed arrow). The floating dot indicates a message posted by a T/TC that was not addressed to anybody, and which did not receive any direct response.

Two key findings emerge from Figure 2. First, the interaction tended to be centred around T/TC messages. Most of the exchanges took place between T/TC. When a researcher initiated an exchange by addressing a T/TC by name, there was no reply. This is obvious, for instance in Week 3, where the researcher addressed seven different T/TCs but none of them wrote back or seemed interested in carrying the conversation further. There were only two exceptions to this observation: In Week 1, there was an exchange between a T/TC and the guest researcher. It is to be noted, however, that the researcher in that case, was also the course instructor and therefore, she was familiar to the T/TC.

The apparent reluctance to interact directly with peers and researchers was confirmed by the analysis of the social cues in the posted messages. Table 3 shows the number and type of social cues used in the forum messages by both researchers and T/TC. In fact, 13 researcher messages contained instances of social cues. Compliments and closures were the most common cues used. However, only 13 T/TC messages included social cues. The most common cues used by T/TCs were Expression of feelings and Closures. While it is not possible to draw any strong conclusions based on these low frequency numbers, it is clear (based on Figure 2 and Table 3) that both researchers and T/TC did not see the forum as a social space. They used it as a platform to post their messages, while almost discounting the other members, be they T/TC or researchers.

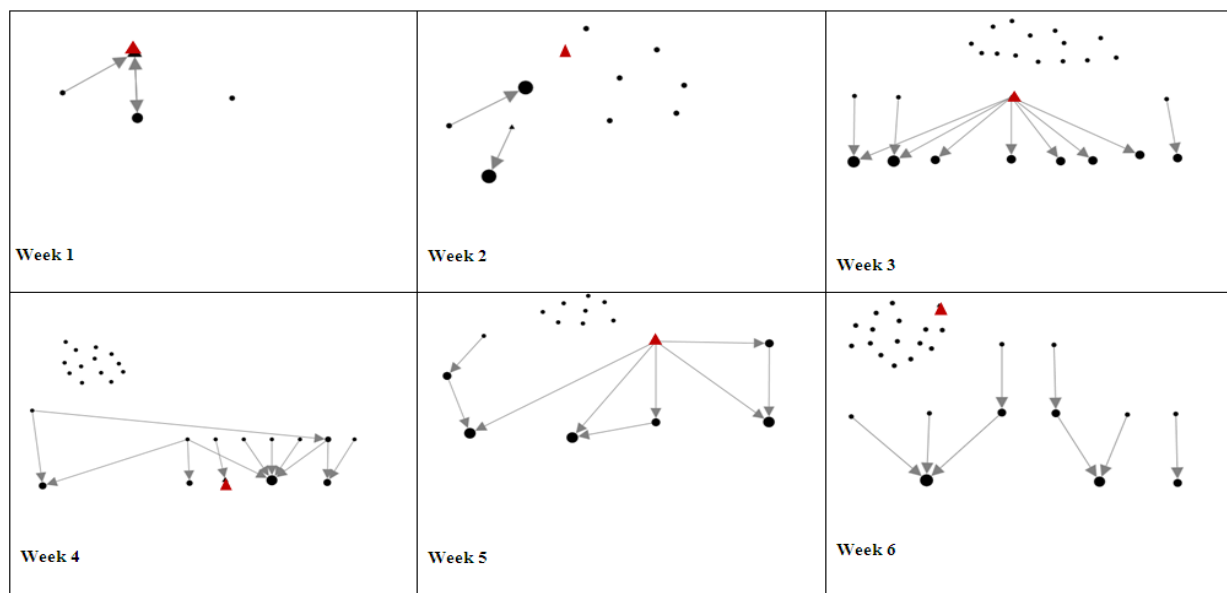


Figure 2: User-to-user interaction

TABLE III.
NUMBER AND TYPE OF SOCIAL CUES IN FORUM MESSAGES

	Researchers				T/TC	
	Total	Number of messages	Type of Social cues used	Number of messages	Type of Social cues used	
Week 1	3	2	2 Compliments	1	1 Compliment	
Week 2	10	5	3 Compliments 2 Closure 1 Greeting 1 Expression of feeling	5	4 Closure 1 Greeting	
Week 3		0	0	0	0	
Week 4		0	0	0	0	
Week 5	4	2	2 Closure	2	2 Expression of feeling	
Week 6	9	4	2 Closure 1 Greeting 1 Compliment	5	3 Expression of feeling 2 Compliments 1 Closure	
	26	13		13		

Second, Figure 2 shows a considerable number of messages that appeared to be unrelated to the rest of the conversation. For instance, there were 14 and 13 floating messages in weeks 3 and 4, respectively. The authors of these messages did not address their messages directly (i.e., they did not name a specific addressee). However, our close reading of the data indicates that these messages were thematically coherent and related to the rest of the conversation. This was clearly reflected in the user-to-thread maps in Figure 3, which relates each message (represented as a dot for T/TC or a triangle for researcher) and the theme(s) it tackles. As mentioned above, the focal topics were identified and coded in the first stage of data analysis of this project (see Knouzi & Mady, 2015).

Figure 3 reveals three significant features of the *content* of the forum interaction. First, the first week exchange was limited and 'slow' in that only 5 topics were raised and only three topics were commented on by more than one forum member. This pattern changed in the following weeks as the number of the topics increased (e.g., 11 topics in Week 2, 8 topics in Weeks 2 and 5, 9 topics in Week 6), and the number of messages commenting on topics increased. Therefore, it seemed after an adjustment period where participants hesitated to tackle topics raised by other users, they began to 'pick up' threads of conversation, thus creating a seemingly coherent conversation.

Second, there was no difference in the pattern of interaction with the topics addressed by the researchers or the T/TC. In other words, the identity of the users discussing any given topic did not seem to influence the number or type of participants addressing the same topic. Therefore, the focus of interlocutors was on the content and discussion at hand, regardless of the identity of the contributors.

Third, almost every topic raised was taken up by at least another user (with very few exceptions), which denotes an important level of coherence and homogeneity in the resulting exchange. This finding is especially important for our discussion of distance and solidarity in the forum. While the lack of social clues and the interaction pattern mapped in Figure 2 seem to point towards some guarded distance or reluctance to engage in the forum space, the findings of the user-to-thread maps suggest that the identity was less important and that the participants did engage in discussion of common topics and concerns.

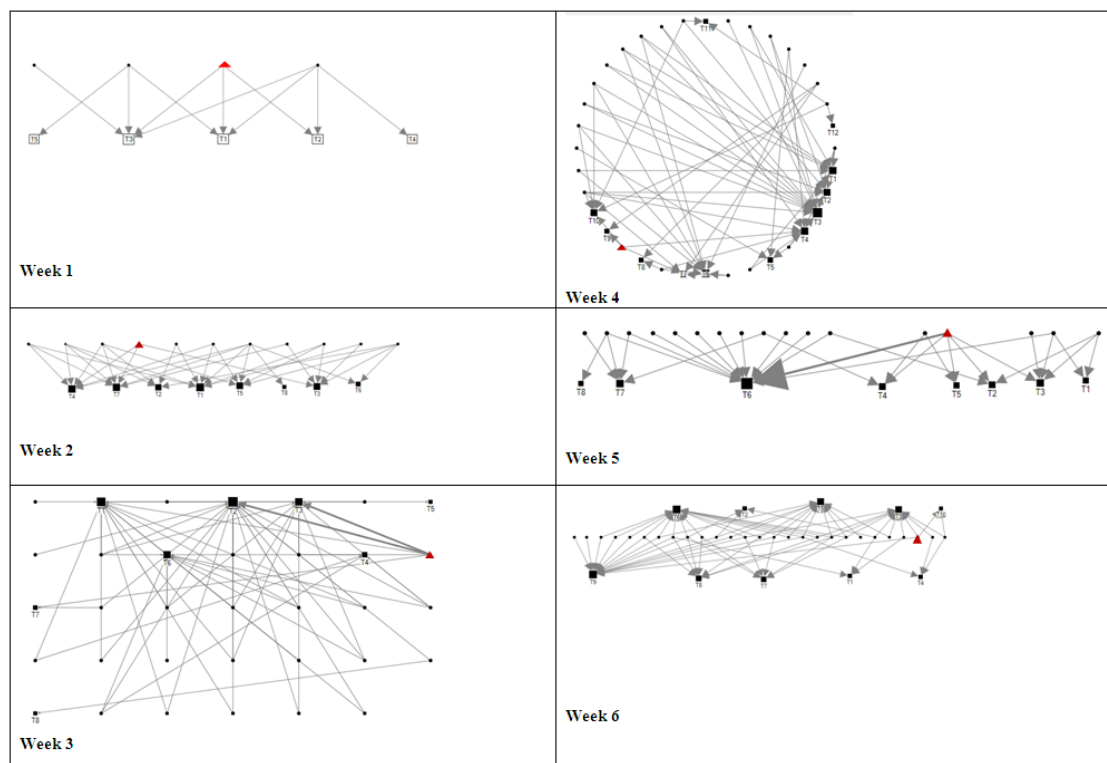


Figure 3: User to topic interaction

B. Level of Cognitive Processing in Weeks 3 and 4

For this analysis, we coded each forum message posted on Weeks 3 and 4 for the occurrence of surface-level and in-depth level cognitive processing mechanisms. Unlike Hara et al. (2000), we coded for 8 sub-categories (see Table 4) in order to better understand the cognitive activity that the participants engaged in while interacting in the forum space. Messages that contained instances of both levels of cognitive processing were coded as such.

Table 4 reports the results of the analysis. It shows a similar pattern over the two weeks. This is especially clear in the behaviour of the T/TCs and less so in the behaviour of the researchers because of the limited contribution of the second guest researcher on Week 4. The researchers used more in-depth processing mechanisms, especially, ‘supporting judgment with examples and justifications’ and ‘offering new elements of information’. In fact, both researchers stated their opinions and provided examples and anecdotes to explain, support and justify their positions as illustrated in the following example from the data where the researcher explains (‘this means’) that effective content-based instruction requires that both content and language learning objectives be defined in advance. This distinction adds depth to the argument that was being discussed and clarifies aspects of the approach that may have not been stated explicitly before.

“It has been shown that merely teaching content through language will not lead to effective language learning (Lyster, 2007; Swain, 1996). This means we need both content learning objectives and language learning objectives for each lesson. The planning for content and language learning objectives can help to secure a better balance between the two.” [Researcher, Week 3]

Researchers also used the forum space to extend the arguments presented in their featured articles by ‘offering new elements’ such as connections to other research or theories. In the following quote, the researcher introduces the notion of content-obligatory language, and because a full definition of the concept was beyond the scope of the forum space, the researcher offered references for the readers who would like to learn more about it. By introducing this new concept, the researcher broadened the scope of the conversation and drew the readers’ attention to more sources of knowledge.

“Second, from the content teachers’ perspective, subject-related vocabulary is often content obligatory (see Snow, Met & Genesee (1989) for the concepts of content obligatory language and content compatible language.” [Researcher, Week 3]

The T/TCs used the two levels of processing equally, with no clear order. Often students started with restating the thesis of the week’s article or the opinion expressed in a previous message and then built on it by citing examples from their lived experiences as learners or novice practitioners. Table 4 shows that, within surface level processing, T/TC resorted mostly to showing agreement with previous messages by either mentioning the writer or the idea (‘Stating that one shares ideas already stated’) or quoting or paraphrasing the content of a previous message (‘Repeating what has been said’), as shown in the first and second quotes below, respectively.

“Je suis tout-à-fait d'accord avec les postes antérieures qui indiquent qu'un contenu engageant sert à mieux captiver et à motiver les étudiants de FLS.” [TC 28, Week 3]

[I agree completely with the previous messages that argue that an engaging content helps draw and motivate FSL students.]

“[Auteur de l’article de la semaine] est reconnaissante du fait qu’il est souvent difficile de renforcer la grammaire et un bon usage de la L2, surtout dans les niveaux junior ou intermédiaire, car la matière devient de plus en plus lourde pour les élèves, ce qui veut dire plus de terminologie difficile à apprendre.” [TC 07, Week 3]

[Author of the featured article] recognizes the fact that it is often difficult to reinforce grammar and L2 accuracy, especially in the junior and intermediate levels because the content becomes richer, which means that the jargon is harder to learn.]

These restatements helped create a sense of coherence and fluidity in the forum as they connected messages and themes explicitly. In other words, messages were not posted in a vacuum. They built on what was becoming shared knowledge.

In terms of in-depth processing, the T/TCs relied mostly on establishing connections between the theoretical discussions of the topic of the week’s article and pertinent aspects of their lived experiences as language learners and novice practitioners. In the following quote, for instance, a TC, recalled her experience as a volunteer in a French immersion class where the teacher applied some aspects of the content-based instruction approach that was discussed in the week’s article.

“Il y a quelques ans, j’étais bénévole dans une classe de huitième année immersion française. En lisant cet article, je me souviens de comment le professeur a combiné l’enseignement de l’histoire avec l’enseignement du français.” [TC 04, Week 3]

[A few years ago, I was a volunteer in a Grade 8 French immersion class. While reading this article, I recalled how the teacher combined history teaching with French language teaching.]

In the rest of her message, she connected what she observed in that class (the activities assigned to students, the level of engagement she observed) to the main argument of the article and offered her anecdote as an example to further support it.

TABLE IV.
OCCURRENCE OF COGNITIVE PROCESSING MECHANISMS.

	Week 3			Week 4		
	Researchers	T/TC	Total	Researchers	T/TC	Total
Surface level processing	1	19	20	0	19	19
Making judgment without justification	0	1	1	0	0	0
Stating that one shares ideas already stated	1	11	12	0	12	12
repeating what has been said	0	10	10	0	11	11
Asking irrelevant questions	0	0	0	0	0	0
In-depth processing	7	23	30	1	19	20
Linking facts and ideas	3	17	20	0	13	13
Offering new elements of information	4	13	17	1	8	9
Discussing advantages and disadvantages	0	4	4	1	3	4
Supporting judgment with examples and justifications	7	10	17	1	7	8

The second most frequent type of in-depth processing in the T/TC messages was ‘offering new elements of information’ when T/TC expanded the topic at hand and introduced a new idea or highlighted a new aspect of the issue at hand. In the following quote, the TC introduced the idea of ‘teacher training and preparation’ as an important factor to consider in the process of implementation of content-based instruction. Teacher education was not raised explicitly in the article.

“Pour que la langue et le contenu soient intégrés de la meilleure façon possible, il se révèle essentiel de former les enseignants aux pédagogies associées à ces deux concepts.” [TC 02, Week 3]

[To be able to integrate language and content teaching in the best possible way, it is essential to train teachers in the pedagogies related to these two concepts.]

Third, the T/TC provided well-thought explanations and justifications to support their statements. In the following example, the TC started by restating the main argument of the week’s article and the previous messages. She then proposed a hypothetical scenario to illustrate how she projected to implement content-based instruction in her classes. The example denotes an in-depth cognitive processing because it shows the TC’s effort to appropriate the new information and integrate it in her understanding of best teaching practices. It also serves to illustrate her point to other readers and thus further explicate content-based learning in the context of FSL.

“Alors, il faut choisir du contenu engageant pour des étudiants. Puis, l’enseignant doit choisir le vocabulaire important associé au contenu. Par exemple, si je veux explorer la culture franco-africaine avec mes étudiants de 10e année, il faut que je décide sur le vocabulaire nécessaire pour qu’ils puissent apprendre le contenu.” [TC 01, Week 3]

[Therefore, one must choose an engaging content for the students. Then, the teacher has to choose important vocabulary related to the content. For example, if I want to explore Franco-African culture with my Grade 10 students, I must choose the necessary vocabulary so that they can learn the content.]

IV. SUMMARY AND DISCUSSION

The present study documented the implementation of the KTA model in a L2 education context, mapped the structure of the interaction between a group of L2 researchers and L2 novice practitioners in a virtual forum, and analyzed the level of cognitive processing evident in the contributions of both groups when posting messages on the forum. The design and the nature of the data collected and analysed for this paper helped make pertinent aspects of the interaction dynamics between the two groups visible, which, in turn helped highlight some of the advantages and the shortcomings of the KTA model as implemented in this case.

In terms of the structure of the interaction between the researchers and the T/TCs, the T/TC seemed reluctant to engage in direct communication with the researchers/authors of the weekly articles. In fact, the low number of individual T/TC participation (i.e., one message posted per week to meet the course requirement) and their tendency to respond and engage only other T/TC could be interpreted as a sign of disengagement or lack of interest in the dialogue taking place in the forum. However, this was disproved by the mapping of the user-to-thread pattern and the analysis of the level of cognitive processing in posted messages which revealed that T/TC and researchers discussed a variety of related topics that were raised by either parties. This analysis showed that the restatement of previous messages or topics helped create a sense of coherence and fluidity in the forum discussion. It also revealed that participants drew on a number of personal resources to enrich the dialogue and expand the debate in pertinent ways. The T/TCs used anecdotes from their previous experiences as learners or novice teachers to lend support to the arguments made in the published articles. The examples and justifications offered by both groups helped further clarify the concepts being discussed and make them more transparent and thus more actionable. Consequently, the forum became a site for the co-construction of new knowledge that built on but also expanded the knowledge conveyed in the published articles. It is important to underline that in this act of co-construction, the roles and identities of the participants became less defined/more fluid. In other words, while there were several indications of both groups' preference to maintain and operate exclusively in their respective discourse (low participation, low use of social clues), the quality of the dialogue and the cognitive effort demonstrated by both groups points towards a certain level of boundary-crossing. For instance, T/TC proposed new ideas and offered justification and examples to support the arguments of the weekly articles. In so doing, they created new forms of knowledge, a role conventionally attributed to researchers. This is in line with the results of other analyses we conducted on the same messages. Analysis of the linguistic and ideational choices of researchers and T/TC's messages revealed that they did address the same topics, albeit adopting different, sometimes divergent views and foci (Knouzi & Mady, 2015). However, in spite of the apparent differences, we found that the T/TC engaged meaningfully with the research, even if not necessarily with the researchers.

The above findings offer potential avenues to inform future research and practical applications. As it pertains to future research, use of multiple mapping analyses may provide for greater understanding of communication patterns. Further, given the one-week participation of multiple researchers over the duration of this project, it would be worth exploring whether interaction patterns would differ if one researcher were to participate over a longer period of time. Practically, this study highlights the potential for shared space and themes of common interest to allow for practitioners and researchers to share in knowledge construction.

REFERENCES

- [1] Abbasi, A., & Altmann, J. (2011, January). On the correlation between research performance and social network analysis measures applied to research collaboration networks. In *System Sciences (HICSS)*, 2011 44th Hawaii International Conference on (pp. 1-10). IEEE.
- [2] Allison, D. & Carey, J. (2007). What do university language teachers say about language teaching research?. *TESL Canada Journal*, 24(2), 61–81.
- [3] Bartels, N. (2003). How teachers and researchers read academic articles. *Teaching and Teacher Education*, 19, 737–53.
- [4] Blanchet, K., & James, P. (2012). How to do (or not to do)... a social network analysis in health systems research. *Health Policy and Planning*, 27(5), 438-446.
- [5] Cochran-Smith, M., & Lytle, S. (1999). The teacher research movement: A decade later. *Educational Researcher*, 28(7), 15–25.
- [6] Cooper, A. (2010). "Knowledge Brokers: A Promising Knowledge Mobilization Strategy to Increase Research Use in Education", Paper presented at the Annual Meeting for American Education Research Association, Denver, Colorado.
- [7] Davies, H. & Nutley, S. (2008). Learning more about how research-based knowledge gets used: Guidance in the development of new empirical research, William T. Grant Foundation, New York, NY.
- [8] Davies, P. (2000). The relevance of systematic reviews to educational policy and practice. *Oxford Review of Education*, 26(3-4), 365-378.
- [9] Ellis, R. (2001). Second language acquisition: Research and language pedagogy. In C. Candlin & N. Mercer (Eds.), *English language teaching in its social context* (pp. 44–74). London: Routledge.
- [10] Graham, I., Logan, J., Harrison, M., Straus, S., Tetroe, J., & Caswell, W. (2006). Lost in knowledge translation: time for a map? *Journal of Continuing Education in the Health Professions*, 26, 13–24.
- [11] Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional science*, 28(2), 115-152.
- [12] Hargreaves, D. (1997). 'In defence of research for evidence-based teaching: a rejoinder to Martyn Hammersley', *British Educational Research Journal*, 23(4), pp.405–419.

- [13] Hemsley-Brown, J. (2004). 'Facilitating research utilization: A cross-sector review of research evidence', *The International Journal of Public Sector Management*, 17(6), pp.534-552.
- [14] Henri, F. (1992). Computer conferencing and content analysis. In A. Kaye (Ed.), *Collaborative learning through computer conferencing* (pp. 117-136). Berlin: Springer Verlag.
- [15] Herrenkohl, L. R., Kawasaki, K., & Dewater, L. S. (2010). Inside and outside: Teacher-researcher collaboration. *The New Educator*, 6(1), 74-92.
- [16] Hess, C. O. & Ostrom, E. (Eds.) (2007). *Understanding knowledge as a commons: From theory to practice*. Massachusetts: Massachusetts Institute of Technology.
- [17] Howell-Richardson, C., & Mellar, H. (1996). A methodology for the analysis of patterns of participation within computer mediated communication courses. *Instructional Science*, 24(1), 47-69.
- [18] Knouzi, I. & Mady, C. (2015). Understanding the linkage gap between L2 education researchers and practitioners. *Brock Education: A Journal of Educational Research and Practice* 24, (2), 40-59.
- [19] Lagemann, E. C. (2002). *An elusive science: The troubling history of education research*. Chicago: University of Chicago Press.
- [20] Lavis, J. N., Robertson, D., Woodside, J.M., Mcleod, C.B., & Abelson, J. (2003). 'How Can Research Organizations More Effectively Transfer Research Knowledge to Decision Makers?', *The Milbank Quarterly*, 81(2), pp.221-248.
- [21] Levin, B. and Cooper, A. (2010). 'How do people learn about research?', *Education Canada*, 50(3), 26-28.
- [22] Mady, C. (2012). Second language research and teaching: Bridging the gap. *Babel* 47 (2) 30-37.
- [23] Mady, C. (2013). Reducing the gap between educational research and second language teachers' knowledge. *Evidence and Policy* 9 (2), 1-22. <http://dx.doi.org/10.1332/174426413X662509>.
- [24] Mollica, A., Philips, G., & Smith, M. (2005). Teaching and learning French as a second language: Core French in the elementary schools in Ontario. Report prepared for the Ontario Modern Language Teachers' Association.
- [25] Muhling, S. (2012). Linking second language research and practice: Bridging the gap between course Work in teacher education and the real world. *Reflections* 31 (1), 10.
- [26] Rickson, M. (2005). Practitioners use of research, The National Educational Research Forum: UK.
- [27] Smylie, M. & Corcoran, T. (2009). 'Nonprofit organizations and the promotion of evidence-based practice in education'. In J. Bransford, D. Stipek, N. Vye, L. Gomez & D. Lam (Eds.) *The role of research in educational improvement*, Harvard Education Press: Cambridge Massachusetts.

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