Discussion, Cooperation, Collaboration: The Impact of Task Structure on Student Interaction in a Web-based Translation Exercise Module

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Discussion, Cooperation, Collaboration: The Impact of Task Structure on Student Interaction in a Web-based Translation Exercise Module[1]

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Abstract.

A major challenge facing the online translation instructor is to design learning opportunities that encourage communication and the sharing of ideas between students. This article asks how such group interaction may be facilitated and evaluates, in particular the impact of task structure on student interaction in an online translation exercise module. Drawing on an empirical study carried out at Dublin City University during the academic year 2003/14, the article compares levels of intermessage referencing, the number and size of message clusters, and extent and type of cognitive presence evident in messages posted by students given three different types of task structure: those involving discussion groups, cooperative groups and collaborative groups. The article concludes that online interaction is most successful in discussion groups, followed in order of positive outcomes by cooperative groups and collaborative groups.

Keywords. Online learning, E-learning, Task structure, Discussion group, Cooperative group, Collaborative group, Cognitive presence, Intermessage reference analysis, Message cluster, Interaction, Translation training.

1. Introduction

Interaction may be considered a defining feature of all education (Garrison and Anderson 2003:41). Dewey described the educational experience as a "transaction taking place between an individual and what, at the time, constitutes his environment" (1938:43). The learning 'environment' referred to by Dewey may include on the one hand human and non-human actors, e.g. other students and instructors, and on the other hand information and content. Thus learning occurs as a result of teacher-student, student-student and student-content interaction. However, central to the learning process are human interactions, what Palloff and Pratt refer to as "the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions" (2007:4).

The online environment may not initially appear to be an obvious medium for interaction between learners. When internet-based instruction first made its appearance on the educational stage in the late 1980s, it was viewed as an extension of distance learning, "characterized by a kind of electronic correspondence study" (Dirkx and Smith 2004:133) in which learners interacted with large volumes of printed material and, occasionally, with an instructor. Over time, **e-learning** came to be recognized as offering certain pedagogical advantages over its older, distance-learning relative: not only could the World Wide Web be used to store and deliver vast quantities of information by electronic means, but internet-enabled computer-mediated communication added "the most critical feature of the formal education process - interaction between and among teacher, students, and content" (Garrison and Anderson 2003:41). Yet despite the promise that e-learning might hold for translator training, little research has so far been published on the subject.

Against this background, this article sets out to explore how group interaction may be facilitated and evaluated in online translator training settings. Based on an empirical study

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conducted at Dublin City University (DCU) in the academic year 2003/4, it looks in particular at the impact of task structure on online student interaction. The article begins with a review of relevant literature in the fields of computer-mediated communication, translation pedagogy, and group learning, and goes on to describe the study carried out at DCU. The article has a contribution to make on a number of fronts: it explores the implications of designing translation instruction for Web-based delivery, it adds to the literature on online group-learning structures, and it presents a model for instructors and researchers to investigate the quality of student interaction in an online translation classroom.

2.   Review of the literature

2.1 Computer-mediated communication

In its broadest sense, **computer-mediated communication** (CMC) refers to any kind of text-based discourse in which messages are transmitted and received using computer technology. Some writers include video, audio and graphics in their definition of computer-mediated communication. However, the majority of widely-used virtual learning environments such as Moodle® and WebCT® continue to support primarily text-based communication, i.e. electronic mail, bulletin boards and computer conferencing. In many educational publications (e.g. Warschauer 1997), use of the term 'CMC' is restricted further to asynchronous (participation occurs with a time delay, as in email communication), text-based computer conferencing supporting communication that is many-to-many (all participants can post, read and respond to all postings). It is in this sense that the term 'CMC' is used in the present article.

The benefits of asynchronous text-based communication in the context of group activity and student interaction have been widely discussed in the research literature (see e.g. the online *Journal of Asynchronous Learning Networks*) and may broadly be classified into two types. Firstly, asynchronous communication has *organisational* benefits. Group projects may be facilitated throughout the entire working week, several discussions may be supported simultaneously, and students may initiate conversation with each other and with the instructor at any time. Secondly, and more significantly, asynchronous communication may be said to benefit the *learning process*. Warschauer pinpoints the ability "to freeze a single frame and focus attention on it" as one of the great strengths of computer conferencing (1997:472), enabling participants to take time to reflect on and compose reactions to discussions and course material. Garrison and Anderson emphasize the learning advantages afforded by the interactive and reflective features of asynchronous communication: "the capability to precipitate private reflection as well as public discourse within a community of learners" (2003:23).

2.2 E-Learning and translator training

The literature on e-learning in the field of translator training is conspicuous in two respects. Firstly, there is a general paucity of research publications on the subject. No published textbook exists in the area, although a number of papers have appeared in journals (e.g. Reinke 1997, Gillespie 2000, Millán-Varela 2001, Folaron 2002, Massey 2005, Kenny 2006) and in a collection published by the Intercultural Studies Group at the University of Tarragona in Spain (Pym *et al*. 2003). Secondly, there is an absence of empirical investigation reporting and evaluating in a systematic way the experience of delivering translation programmes online. What literature does exist tends to be of a conceptual nature, focusing on design principles (e.g. Reinke 1997) and on providing a rationale for creating e-learning opportunities within translator education (e.g. Folaron 2002). In particular, the question of online interaction between course participants is barely addressed, and where it is,

no attempt is made to evaluate the quality of the group-learning experience. One early exception is Reinke (1997), who draws on Paulsen's (1995) distinction between four pedagogical techniques for computer-mediated communication (CMC), one-alone, one-to-one, one-to-many and many-to-many, and examines how Paulsen's pedagogical techniques may be used to support six teaching strategies identified by Nord (1996). However, while Reinke's article contains some useful instructional suggestions, his evaluation of the different strategies remains speculative in nature as the following statement illustrates:

> Gegenüber einer traditionellen Face-to-Face-Lernsituation *könnte* die Online-Diskussion zu einer gleichmäβigeren Beteiligung aller Gruppenmitglieder führen, wenn der Einzelne in der Diskussion anonym bleiben kann. (Reinke 1997:149) [Compared to a traditional face-to-face learning situation, online discussion *could* lead to more equal participation by all group members if the individual can remain anonymous in the discussion; translation and italics mine.]

Other studies that touch on group-learning techniques in the online translation classroom include Gillespie (2000), Millán-Varela (2001) and O'Hagan and Ashworth (2002). Gillespie (2000) describes using computer conferencing to support one-to-one communication between students and tutors and between pairs of students, but in his study the full potential of computer conferencing to support group work is not investigated. Similarly, Millán-Varela (2001) discusses the implementation of an electronic mailing list for an online distance MA in Translation Studies but finds that students are reluctant to use it because of "lack of time and too much self-awareness" (2001:133). Finally, O'Hagan and Ashworth (2002) describe in brief a virtual translation course at the University of Hawaii in which students post assignments to a bulletin board for peer review and gain experience working in virtual teams on group translation tasks. On the basis of this experience, the authors list some of the benefits and drawbacks of using text-based, asynchronous communication to deliver Web-based translator training.

2.3 Student interaction in classroom-based translator education

In the context of face-to-face translator training, two main arguments are put forward in the literature for the integration of teamwork and group interaction into the instructional situation. The first may be termed the 'workplace argument'. This is based on the consideration that teamwork plays a pivotal role in the authentic translation workplace (Vienne 2000, MacKenzie and Vienne 2000, Nord 2005). Vienne, for example, argues that in their future professional lives, translators "will overwhelmingly have to work in co-operation with other translators" (2000:96). Notwithstanding the fact that the greater part of the actual translation task goes on in the individual translator's mind (Mossop 2001 :xv), professional translators must liaise with colleagues when translating different parts of a larger document or when translating the same source text into a number of target languages. This is illustrated by Kelly (2005:33), who identifies as key components of the interpersonal competence required of the professional translator the

> ability to work with other professionals involved in [the] translation process (translators, revisors, documentary researchers, terminologists, project managers, layout specialists), and other actors (clients, initiators, authors, users, subject-area experts).

The second rationale for making student interaction a cornerstone of translation instruction may be termed the 'pedagogic argument'. This position is championed by Kiraly (2000, 2003), who argues that learners working in groups help one another to construct knowledge and to learn the skills required of the professional translator. Drawing on the vast body of

literature on social constructivism, he identifies as an essential feature of the social constructivist translation classroom a group-learning environment "including not only interaction among students but also the extensive involvement of the students in every aspect of the teaching/learning process" (Kiraly 2003:30). Group interaction enables students to develop, share and evaluate multiple perspectives by bringing their subjective viewpoints to the learning situation and testing these against the ideas and beliefs of the group. Disparate views are evaluated in order to arrive at an interpretation that is relevant and acceptable to the majority. In this way, meaning and knowledge are negotiated and constructed through interaction and discussion. The act of collective learning fulfils the dual goals identified by Kiraly: "meaning-making on the part of the group" and "the appropriation of cultural and professional knowledge on the part of each individual group member" (2000:36).

2.4 Instructional implications: how to structure group interaction

The two rationales for group learning in the translation classroom outlined above have important, and divergent, instructional implications. The 'workplace' argument suggests that students should interact in small groups to create a group translation, with each member assuming a different role – that of terminologist, translator, reviser, project manager – as this is what happens in the authentic translation workplace. Hence, Nord (2005:218) calls for the organization of group translation projects "where each student has the chance to play various roles: that of client, of reviser, of terminologist, of documentation assistant, of free-lancer, of in-house translator working for a translation company, etc.". The 'pedagogic' argument implies a less structured approach and allows for the production of translations on an individual or group basis. Students work in parallel on the same tasks and provide both cognitive and emotional support to one another through dialogue and conversation. As Gonzalez Davies points out, there is room on the translation curriculum for both 'real-life' tasks "that imitate professional assignments, or take the professional world into the classroom" and pedagogic activities that "help to explore and practise the skills that will enable the students to perform according to professional standards later on" (2004:19).

In order to address the question of how group interaction in an online translation classroom may be structured, we need to turn to the literature on group learning in general and on Web-based group learning in particular. Graham and Misanchuk (2004) distinguish four types of learning structure. These are labelled: (1) independent or self-study; (2) discussion groups; (3) cooperative groups; and (4) collaborative groups. In order to make the distinction between the four learning structures clear, Graham and Misanchuk use the term **interdependence**, which they define as learners' "dependence on each other to accomplish the learning goals" (ibid.:183). The level of interdependence present in each of the four learning structures is depicted in Figure 1 (from Graham and Misanchuk 2004:184), which displays the four types of learning structure on a scale from no interdependence to high interdependence.

None	Medium		High
Independent or self study	Discussion groups	Cooperative groups	Collaborative groups
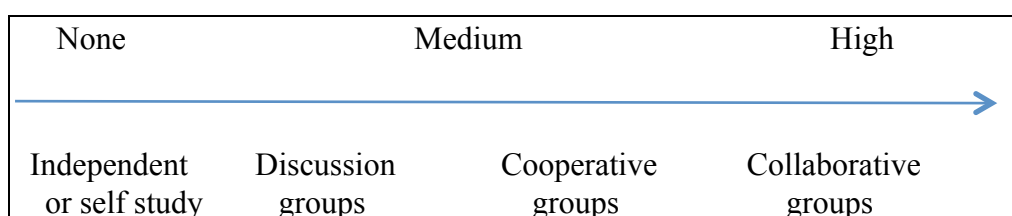
Figure 1. Level of interdependence in a learning environment

The low end of the spectrum shown in Figure 1 is typical of independent or self-study programmes where learners are dependent only on themselves (and perhaps a grader) to

achieve their learning goals. At the opposite end of the scale, Graham and Misanchuk place collaborative groups which "have a common purpose", where "all group members contribute to all significant aspects of the group's work" (ibid.:183) and where a group grade is issued for a common learning product. Instructional strategies involving medium levels of interdependence include discussion groups and cooperative groups. According to Graham and Misanchuk, discussion groups can involve a range of interdependence but "typically individuals are assessed on their individual insights and contribution" (ibid.:184), i.e. on an individual learning product. Finally, cooperative groups have a "'divide and conquer' mentality where the group divides the work into chunks that can be done independently, and then assigns the pieces to individual group members" (ibid.). Graham and Misanchuk argue that in cooperative groups, interdependence tends to occur mainly at the administrative level where decisions are made on matters relating to task division and allocation.

In what follows below, the three terms used by Graham and Misanchuk to denote group structures are adopted and applied to the online translation classroom. The term **discussion group** refers to a structure in which large groups of learners provide cognitive and emotional support to one another through conversation and dialogue while working simultaneously on the same task and engaged in the creation of individual learning products. The term **cooperative group** refers to a small group of learners engaged in the production of a group artefact where the work is divided into chunks carried out independently by group members, and the term **collaborative group** refers to a small group of learners engaged in the creation of a group product, where group members work synchronously and in parallel on all aspects of the task.

Before concluding this section, we should note that Kiraly expresses doubts as to the ability of computer-mediated communication to support the sharing of multiple perspectives and the joint construction of knowledge central to his approach. He argues that when interaction is 'virtual', i.e. mediated by computer, "many-to-many interaction is likely to give way to one-to-one communication, with pairs of students communicating via email or networked chatting functions" (2000:128). For this reason Kiraly cautions against the use of virtual groups and recommends that students be allowed to sit together and share knowledge in face-to-face dialogue. One of the aims of the present article is to put to the test Kiraly's assertion that social constructivist learning requires physical interaction between group members.

3. Methodology

The rest of this article describes an empirical investigation into online translator training undertaken at Dublin City University during the academic year 2003/4. A case study approach was adopted with an emergent design and a primarily qualitative approach to data analysis.

3.1 Research questions

The main question of interest in the study may be formulated as follows: 'What is the impact of task structure on the development of student interaction in an online translation exercise classroom?'. The study asked which of the three types of task structure identified in the literature (discussion groups, cooperative groups and collaborative groups) is most effective in promoting the acquisition of translation skills and knowledge by students interacting via text-based asynchronous computer conferencing in a virtual learning environment.

3.2 Research context

The research described here was carried out at Dublin City University (DCU) during the academic year 2003/4 in the context of the University's Graduate Diploma/MA in Translation Studies. This is a one-year, full-time programme which aims to provide students with

advanced translator training and a postgraduate qualification in Translation Studies. The taught course (the Graduate Diploma) is delivered over 24 weeks, in two equal blocks spread over the first eight months of the year, and eligible students go on to write a Masters dissertation in the remaining four months. Programme objectives include practical training in the translation of a variety of specialized texts in addition to the development of a range of professional and linguistic skills appropriate to the translation profession.

In the first semester of the Graduate Diploma, students undertake a total of five modules. For the purpose of the present study, one of these was identified for conversion to Web-based delivery. This is a translation exercise class in German-English economic translation (module code 'GE502') which focuses on the German-to-English translation of three types of economic text: company reports, economic forecasts and documents relating to labour market policy, in particular the European Social Fund (ESF). As well as providing practical experience in the translation of specialized economics texts, the syllabus covers such issues as text type, source-text analysis, translation evaluation, and translation-related terminological and subject-area research.

The decision to use a translation exercise module for conversion to Web-based delivery was prompted by the belief that such classes constitute the heart of the translation curriculum. In the translation exercise class, the practical exercise of translating a source text into a target language is taken as a point of departure for the discussion of relevant theoretical concepts, research methods, terminology-management skills and translation strategies; see Nord (1996:3 13) for a discussion of the 'Übersetzungsübung', or translation exercise class, as the intersection between translation theory and translation practice. The decision to focus on a module of this kind was also motivated by the conviction that such classes are conducted on the principles of discussion and negotiation, and hence lend themselves to an investigation of online student interaction.

3.3 Research participants

Three groups of people participated in the Web-based translation exercise module: students, instructors and outside experts. Twenty students enrolled and 19 completed the module in its entirety. There was a mixture of English and German native speakers (12 English and 8 German), a predominance of female students (17 out of 20) and a majority in the under-25 age group. There were two instructors – the researcher and the researcher's supervisor – and for one week of the module, an outside expert was invited to join in the online discussions.

3.4 The Virtual Learning Environment at DCU

During the academic year 2003/4, WebCT® was the online learning platform in use at DCU. In common with other virtual learning environments (VLEs), WebCT® combines communication tools (email, conferencing, real-time chat, interactive whiteboard, group work area), with course content tools (interlinked course pages, Web resources) and course management tools (online quizzes and surveys, student tracking software, online grade book). The advantages of a virtual learning platform of this kind include ease of design and use, and the integration of all elements of the online course into a single environment.

Five WebCT® tools were used to construct the student version of the GE502 module website. These were: the *syllabus* tool containing a reading list, contact details for course instructors and information on course aims and outcomes; a *calendar* providing dates and times of course-related events; interlinked *course content* pages containing information about weekly tasks and assignments; two types of *asynchronous communication* tool, WebCT® Mail for one-to-one communication and discussion forums for many-to-many interaction

between course participants; and the *resources* tool in which links to module-relevant websites were provided.

In order to encourage online participation, students were required to make a minimum of two postings per week to the discussion forums, and 10% of the module grade was allocated on the basis of online activity and participation.

3.5 Task design

Participants in module GE502 were required to carry out a total of 22 online tasks excluding pre- and post-course surveys. One of the principles underlying the design of module GE502 was the idea of structured independence, i.e. that while profiting from the time and place independence afforded by the online medium, students should be required to work on the same task at the same time in order to benefit from interacting with one another. Tasks ranged in scope from brief responses to instructor postings to the production of target texts on an individual or group basis. The tasks were classified into one of four types: reflection tasks (e.g. translation diary), translation subtasks (e.g. glossary production), target-text production tasks and translation-related tasks (e.g. translation evaluation). These were implemented using a combination of independent study (5 tasks), whole-class discussion group (15 tasks) and small-group cooperative and collaborative structures (2 tasks).

3.6 Analytical techniques

Transcripts of online discussions generated by group-learning tasks were selected as the main data source, and a combination of numerical and qualitative techniques were used to analyze the transcripts.

NUMERICAL TECHNIQUES

Two numerical techniques derived from Levin *et al*. (1990) were used to identify levels of interaction in the discussion threads from module GE502.3 The first, **Intermessage Reference Analysis**, involves the classification of postings as either 'referenced' (i.e. they either refer to or are referenced by one or more other messages) or 'unreferenced' (i.e. they are independent of all other messages). Having categorized messages in this way, a calculation can be made of the percentage of intermessage references per conference. The second is the identification of **message clusters**, defined by the Levin *et al*. (ibid.) as groups of two or more intermessage references, The assumption here is that the more clusters a conference contains and the larger the size of these clusters, the more interactive the conference may be considered to be.

CONTENT ANALYSIS: COGNITIVE PRESENCE

According to Pena-Shaff and Nicholls, researchers must analyze "both the content of the messages and the patterns of interaction [if they wish] to learn whether computer conferencing can facilitate critical thinking and encourage the process of knowledge construction" (2004:244). Rourke and Anderson (2004:7) recommend that, where appropriate, a coding scheme used in previous research should be employed in the content analysis of conferencing transcripts. Following a search of the content analysis literature (e.g. Henri 1992, Gunawardena *et al*. 1997, Hara *et al*. 2000, Campos 2004, and PenaShaff and Nicholls 2004), the present researcher selected the 'Community of Inquiry' Model, and in particular the cognitive presence dimension of this model (Garrison *et al*. 2000, Garrison and Anderson 2003), as an appropriate tool with which to investigate the quality of student interaction in an educational context.

The most important dimension of the Community of inquiry Model is **cognitive presence**. This is defined by Garrison *et al*. (2001:11) as "the extent to which learners are able to

construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry". Cognitive presence is regarded by the authors as an essential element of critical thinking, which is "a holistic, multi-phased process associated with a triggering event" (Garrison *et al*. 2000:98). Garrison *et al*. have developed a rubric to enable researchers and teachers to identify and categorize indicators of cognitive presence in computer conferencing transcripts; see Table 1, based on Garrison *et al*. (2001) and Garrison and Anderson (2003). In all, the authors identify four categories, which together comprise the cognitive presence dimension. These are hierarchical in nature, proceeding from lower to higher levels of critical thinking as follows: a **triggering** event or communication; **exploration** in search of information and knowledge; **integration** of information and knowledge; and **resolution** of the issue or problem.

Table 1. Cognitive presence rubric

Category	Descriptor	Indicators
Triggering	Evocative (inductive)	Puzzlement Recognising problem
Exploration	Inquisitive (divergent)	Brainstorming Divergence within online community Divergence within single message Information exchange Suggestions for consideration Leaps to conclusions
Integration	Tentative (convergent)	Convergence within group Convergence within message Connecting ideas, synthesis Creating Solutions
Resolution	Committed (deductive)	Vicarious application to real world Testing / defending solutions

When the researcher started to code transcripts from module GE502 using the cognitive presence rubric, two difficulties arose. The first related to the distinction between 'integration' and 'resolution'. Only two postings matched the definition of 'resolution' as "'vicarious application to real world' or 'testing/defending solutions'". These related to a technical problem, and, according to the definition provided in the next paragraph, cannot be considered truly cognitive in nature. Hence, when the cognitive presence rubric was implemented in the investigation described here, only the first three levels – 'triggering', 'exploration' and 'integration' – were used. Example 1 below presents a short cognitive exchange from module GE502 starting with a triggering event, proceeding through two postings classified as 'exploration' and culminating in a message at 'integration' level.

A second difficulty related to the absence of any kind of cognitive presence in a considerable number of conference messages. Many contributions dealt rather with 'non-cognitive' or organizational matters such as planning and managing the learning task, seeking and providing technical support, engaging in social communication and posting short messages of agreement. Hence, in this study, the researcher found it necessary to draw a distinction between **cognitive postings** in which participants engaged directly with the learning material by questioning, brainstorming and proposing solutions related to the learning task, and 'organizational' or **non-cognitive postings**. This made it possible to calculate the extent to which discussions were on-task or off-task and coincidentally gave a reliable indication of the degree to which a true community of inquiry was being created online. Furthermore, analysis

of non-cognitive postings in conferences where such postings predominated helped to shed further light on the effect of task structure on levels and quality of student interaction (see section 4.2 and 4.3 below).

Example 1. Cognitive exchange

Message Content	Cognitive Category
Message no. 587: posted on Tue Nov 25, 2003 11:03 Subject: KMU? Maybe I've missed something, but can anyone tell me what KMU stands for? It's in part 2 a couple of times, I guess it stands for a particular group of people...	Triggering -Puzzlement
Message no. 596: [Branch from no. 587] posted on Tue Nov 25, 2003 12:36 Subject: re: KMU? hi XX, kmu stands for "kleine und mittlere unternehmen". The english abbreviation is SMB (small and medium-sized businesses).	Exploration - Brainstorming
Message no. 598: [Branch from no. 596] posted on Tue Nov 25, 2003 13:45 Subject: re: KMU? Or small and medium-sized enterprises (SMEs)?	Exploration - Divergence
Message no. 600: [Branch from no. 598] posted on Tue Nov 25, 2003 14:47 Subject: re: KMU? sorry for that one. i just checked it in google on irish websites, and SME seems too be much more common than SMB.	Integration – Connecting Ideas

3.7 Unit of analysis

Before concluding this section on research methodology, some words about the unit of analysis are appropriate. In content analysis, the process of 'unitizing' refers to the identification of segments of the transcript that will be categorized and coded. In the study, the entire message was used as the unit of analysis. The authors of the Community of Inquiry Model recommend treating the full message as the unit of analysis as message-level units are more clearly identifiable in a computer transcript than submessage thematic units. Where messages display evidence of more than one phase of cognitive presence, Garrison *et al*. (2001:9-10) recommend two heuristics, which were adopted in this study: coding down (i.e. to an earlier phase) if it is unclear which phase is reflected, and coding up (i.e. to a later phase) if evidence of multiple phases is present.

4. Data analysis

For the purpose of this article, four tasks involving whole-class discussion groups were selected for analysis. In addition, one pair task, in which groups adopted a predominantly collaborative structure, and one small-group task, in which the instructor imposed a cooperative structure, were selected for analysis. Taken together, the six tasks generated a total of 384 postings to discussion forums.

4.1 Discussion-Group Tasks

The four discussion-group tasks involved the production of a target text on an individual basis with the ability to discuss the assignment with all course participants in a public (whole-class) discussion forum. These target-text production activities were selected for description here because they proved to be the most successful of the 15 discussion-group tasks in terms of the evaluation instruments used in the study.

FINDINGS. NUMERICAL MEASUREMENTS

The analysis was undertaken in a number of steps. First of all, Levin *et al.*'s (1990) numerical techniques were applied to the 181 postings generated by the four activities. Figure 2 displays levels of intermessage references as a percentage of overall message numbers for each of the four discussion-group tasks, with measurements of between 89% and 100% intermessage references being recorded. (In Figures 2, 3, 4 and 5, and in Table 2, the numbers originally assigned to these tasks, i.e. #3, #12, #19 and #21, are re-used as labels.)
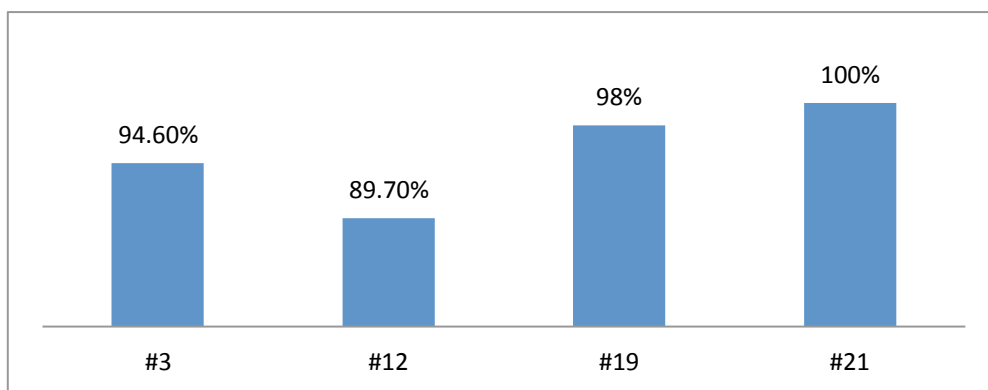

Figure 2. Percentage of intermessage references per discussion-group task

Further insight into levels of interaction was gained by examining message clusters, defined previously as groups of two or more intermessage references. Figure 3 shows the number of message clusters per discussion-group task with levels of between 8 and 21 message clusters being recorded.
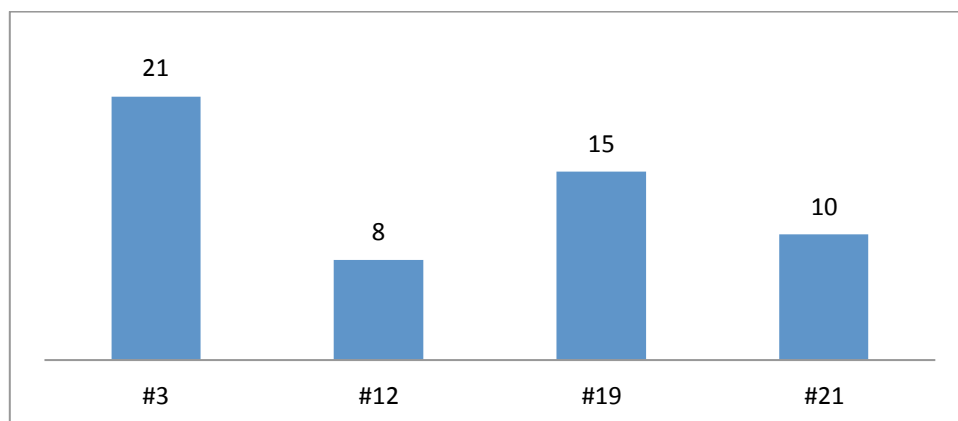

Figure 3. Number of message clusters per discussion-group task

As noted in Section 2.6 above, it is important to take the size of the cluster into account when using message clusters as a measurement of interaction levels. A cluster of two messages is usually an indication of an initiation-response sequence (Mercer 1995:38), and it may be assumed that a cluster of two intermessage references is less interactive than a cluster of three, four, five or more messages. Table 2 contains information about the size of message

clusters in the whole-class discussion-group conferences. This shows that the majority of clusters, or 37 out of 54, consist of three or more messages, suggesting high levels of interaction in the discussion-group tasks.

Table 2. Message cluster size. Discussion-group tasks

Task #	Number of clusters	2 msgs.	3 msgs.	4 msgs.	5 msgs.	> 5 msgs.
#3	21	7	5	4	2	3
#12	8	1	3	3	1	0
#19	15	5	5	2	2	1
#21	10	4	4	2	0	0
TOTAL	54	17	17	11	5	4

DISCUSSION-GROUP TASKS: CONTENT ANALYSIS – ANALYSIS OF COGNITIVE PRESENCE

In this section, the results of two calculations are presented and discussed: the percentage of cognitive vs. non-cognitive postings per discussion-group task (Figure 4) and the percentage of cognitive postings allocated to each level of cognitive presence ('triggering', 'exploration' and 'integration', see Figure 5).
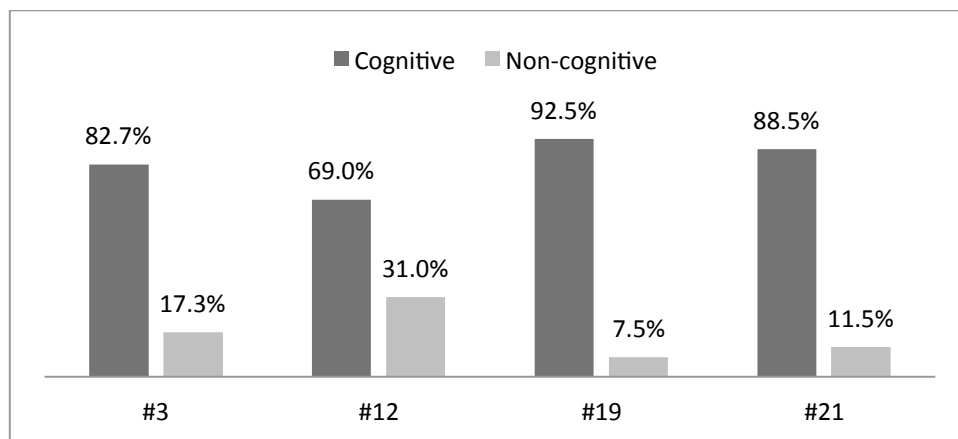
Figure 4. Cognitive/non-cognitive postings per discussion-group task

Figure 4 shows a clear predominance of cognitive messages in all of the discussion-group tasks. The predominance of cognitive postings shows that in their online discussions learners engaged directly with the learning material by questioning, brainstorming, and proposing solutions related to the learning task, rather than focusing on organizational or social matters.

As already indicated, a further step in the analysis of non-cognitive presence involved calculating percentages for the three phases of 'triggering', 'exploration' and 'integration' in those postings classified as 'cognitive'. The results of this calculation are displayed in Figure 5. Figure 5 shows a predominance of postings at the higher levels of cognitive presence – exploration and integration. A common finding in the research literature is that much of the interaction in online discussions tends to be at the lower levels of cognitive presence, i.e. 'triggering' and 'exploration', and that "online discussions typically result in a trivialized (e.g. sharing, comparing, and agreeing) group conversation" (Kanuka and Garrison 2004:3). Clearly this was not the case with the discussion-group tasks in module GE502 where levels of 'integration' at between 27.4% and 40.5% were measured.
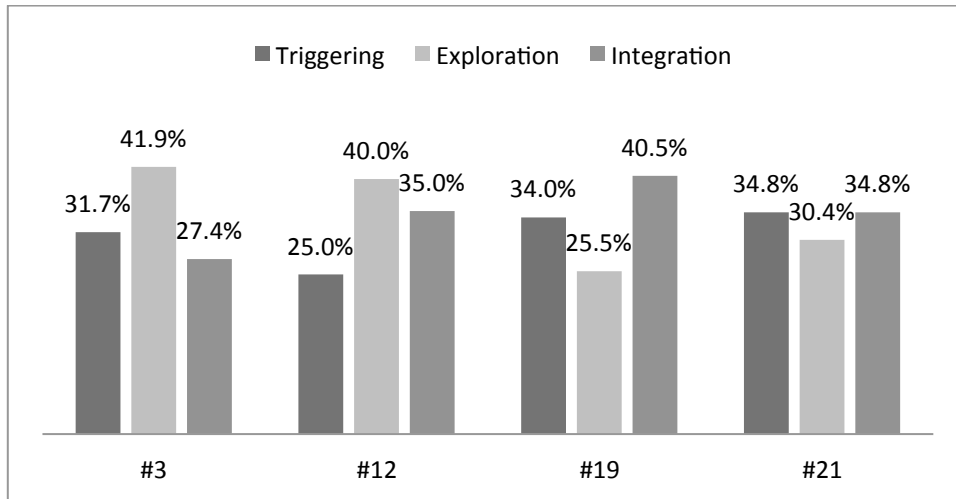
Figure 5. Cognitive presence categories per discussion-group task

4.2 Collaborative-group translation task

During weeks 3 and 4 of the semester, a collaborative-group translation task was implemented, with a certain amount of structure imposed by the module instructors. The group structure in this case was the learning dyad (or triad, see below). Harasim *et al*. recommend using learning dyads as an icebreaker in the early stages of a virtual course: "the teacher assigns each student to a student partner. . ., providing a peer in what is otherwise a new environment" (1996:129). Dyads are particularly valuable as an introduction to online teamwork, since working in pairs is logistically less complex than interacting in larger groups. In module GE502, for logistical reasons, seven groups of two students and two groups of three students were set up for the task. Each dyad or triad (for the sake of simplicity, we refer to both as 'groups' below) was provided with a private discussion forum in which to interact. A total of 52 messages were posted to the private discussion forums and these form the focus of analysis in what now follows.

Subtasks, to include the creation of a glossary, search for parallel texts, subject-area research, formulation of English-language text and proofreading, were identified by the instructors in advance, as were clear deadlines for each subtask. It was expected that students would work together in a collaborative structure on all aspects of the assignment and subtasks were thus not allocated by the instructors to individual students.

COLLABORATIVE-GROUP TRANSLATION TASK. NUMERICAL MEASUREMENTS

A calculation was made of the percentage of intermessage references per group conference and the results of this calculation are displayed in Figure 6. This shows a wide variation in levels from 100% (Groups A, C and H) to 0% intermessage references (Groups B, E, G and I). Closer analysis of the conference transcripts shows that Groups A and H, while recording 100% intermessage references, only posted 2 messages in total, a figure that is too low to allow for meaningful analysis. Three groups – B, E and G – made only one posting each which explains the absence of intermessage references in these groups. We may conclude that with the possible exception of Group C levels of interaction were low for the collaborative-group translation task, particularly if we compare these findings with the levels of between 89% and 100% measured across the whole-class discussion-group tasks (see Figure 2).
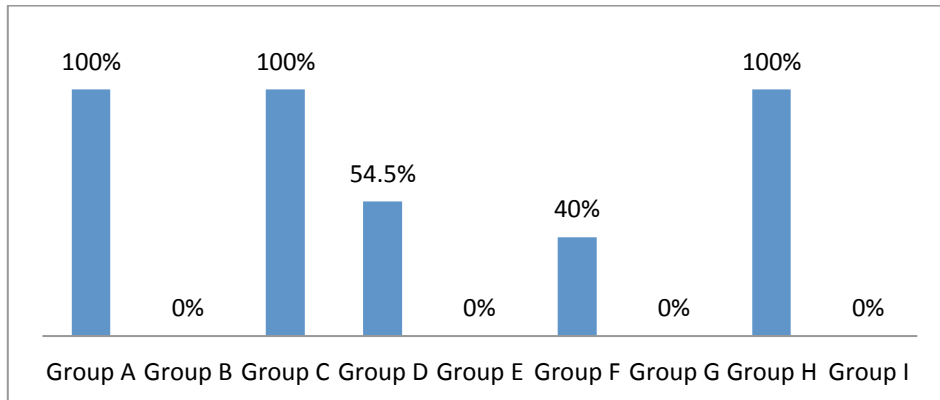
Figure 6. Collaborative translation task Percentage of intermessage references per group

Table 3 displays the number and size of message clusters found in the conference transcripts for the collaborative-group translation task. The overwhelming majority of 2-message clusters also compares negatively to the discussion group tasks where a predominance of clusters with three or more messages was found (see Table 2 above).

	Number of clusters	2 units	3 units	4 units	5 units	> 5 units
Group A	1	1	0	0	0	0
Group C	4	2	1	0	0	1
Group D	3	3	0	0	0	0
Group F	3	3	0	0	0	0
Group H	1	1	10	10	10	0
TOTAL	12	110	11	10	10	

Table 3. Collaborative-group translation task. Cluster size

COLLABORATIVE-GROUP TRANSLATION TASK. CONTENT ANALYSIS: COGNITIVE PRESENCE

When the 52 messages to the small-group conferences were categorized on the basis of the cognitive/non-cognitive distinction, only one was classified as 'cognitive'. This outcome (98% 'non-cognitive' postings) suggests that the collaborative-group translation task did not lead to the creation of a properly functioning online community of inquiry characterized by higher-order learning amongst participants. At 2% cognitive postings, this is also the most important difference to emerge thus far between the collaborative-group translation task and the whole-class discussion-group tasks analyzed in Section 4.1 above.

The 51 'non-cognitive' messages were classified as belonging to one of four categories that emerged in a grounded theory approach to the analysis of these postings: 'file sharing', 'deadlines', 'roles' and 'offline meetings'. The largest category here, at 48%, was 'file sharing', suggesting that groups used their discussion spaces principally to post glossaries, parallel texts and translations to one another, while 'deadlines' accounted for only four postings or 7.8%. The second most prominent category was 'discussion of roles' (27.6%) where students negotiated the division of labour between them. Analysis of these postings shows that seven of the nine small groups adopted the same method of task completion (it is not clear from their conference areas how the remaining two groups allocated tasks). While the instructor had intended this to be a fully collaborative task, the groups took a two-stage approach consisting of a cooperative phase in which members divided the source text in half for terminological research and translation on an individual basis (Group I with three

members divided the source text into three parts), followed by a collaborative stage in which groups pooled their results and compiled the final translation in a joint effort involving all members.

There were nine references to 'offline meetings' across the 51 postings. This, as well as the low message count and the absence of cognitive presence in many of the conferences, allows us to conclude that groups chose to meet in person instead of conducting their business online. Analysis of the content of student postings showed that as long as group members were working in a cooperative structure on subsections of the larger task, interaction (albeit mainly of a non-cognitive nature) took place online. However, when it came to finalizing the learning product, groups found it necessary to communicate and meet offline. This replicates research by Bennett (2004) whose study of online project teams found that "towards the end of the production, some teams found they needed to meet and work on the project together" (2004:17). According to Bennett, students found it necessary to meet face-to-face in order to provide "critical support during the production phase" (ibid.).

The fact that only the cooperative stage was conducted online accounts for the overwhelming predominance of non-cognitive postings to the small-group conferences for this task. While cooperative groups are high on interdependence (see Graham and Misanchuk 2004:183 and Section 2.4 above), the fact that each student was working alone on one half of the translation meant that there was little need or capacity to share information arising directly from the learning task, and where group discussion occurred it focused on management aspects of the task at hand (see Section 4.3 below for more on cooperative groups).

We may conclude our evaluation of the collaborative translation task by stating that postings were predominantly of a non-cognitive nature, with discussion threads being used primarily to arrange offline meetings, share files and discuss task division. When it came to cognitive interaction, and in particular to the discussion and negotiation of final translation solutions in the collaborative phase, the groups preferred to meet in person rather than conducting such discussions online.

4.3 Cooperative-group evaluation task

Towards the end of the semester, a group evaluation exercise was implemented with a cooperative structure and allocation of individual roles. For the purpose of the activity, the class was divided into five groups of three and two groups of two students. Each group contained at least one native speaker of English and at least one native speaker of German, and private conferences, to which the two instructors had access, were set up to enable groups to share files and discuss the assignment. At the beginning of the task, three translated texts were posted to each group's private conference (groups consisting of two members received two texts). These translations had been produced by course participants during the previous week, and translators' names and other identifying features had been removed. The group task involved the compilation of an evaluation report for each of the three translations according to the following criteria: good translation decisions; poor translation decisions; and the extent to which the translation was an appropriate target-language text.

Groups were asked to discuss in their private conference areas strengths and weaknesses of the translations. Following this, each student was required to compile an evaluation report for one text, ensuring that the comments posted by other members of his or her group were reflected in the report. While this task had a cooperative structure with roles and responsibilities assigned to individual students, the principle of intra-group discussion was also emphasized by requiring students to evaluate the merits and limitations of the translated texts in the private conference areas prior to compiling reports.

COOPERATIVE-GROUP EVALUATION TASK. NUMERICAL MEASUREMENTS

When the 151 messages posted to the seven group conferences were analyzed in order to identify referenced and unreferenced messages, the results displayed in Figure 7 emerged:
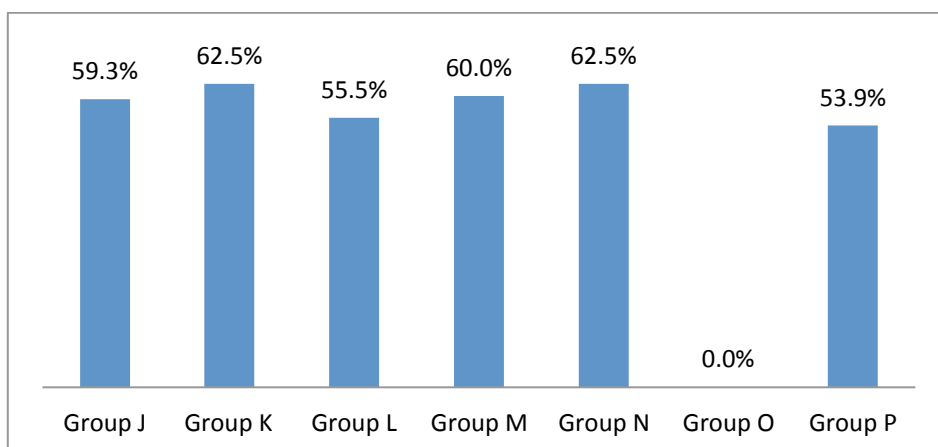

Figure 7. Cooperative group evaluation task. Percentage of intermessage references per group

Figure 7 shows that referenced messages predominated in the small-group conferences, with the exception of Group 0. While this compares favourably to the collaborative task analyzed in Section 4.2 above (see Figure 6), the number of referenced messages is relatively low when compared to the whole-class discussion-group tasks discussed in Section 4. 1, where intermessage references of between 89.7% and 100% were recorded (see Figure 2).

Table 4 displays the number of clusters and the size of the clusters per cooperative-group conference. It shows a total of 27 clusters with a majority (17) containing three or more postings. These results suggest that this task was more interactive than the collaborative translation task and that levels of interaction were comparable to those measured for the discussion-group tasks (see Tables 2 and 3, respectively).

Table 4. Cooperative-group evaluation task. Cluster size

Group	Number of clusters	2 units	3 units	4 units	5 units	> 5 units
Group J	4	0	1	2	1	0
Group K	5	2	1	1	1	0
Group L	4	2	2	10	0	0
Group M	5	2	1	2	0	0
Group N	4	2	2	0	0	0
Group O	0	0	0	0	0	0
Group P	5	2	12	1	0	0
TOTAL	27	10	19	16	2	0

COOPERATIVE-GROUP EVALUATION TASK. CONTENT ANALYSIS: COGNITIVE PRESENCE

Of the 151 postings, 54 (35.8%) were coded as 'cognitive' and 97 (64.2%) as 'non-cognitive'. At 35.8%, cognitive presence across the seven group conferences was higher than for the collaborative translation task, but much lower than for the whole-class discussion-group tasks.

A breakdown of cognitive postings to the small-group conferences using Garrison *et al*.'s (2001) hierarchical model of cognitive presence yielded the following results: 11% 'triggering', 46.3% 'exploration' and 42.6% 'integration'. What is striking about these figures is the high values attributed to both 'exploration' and 'integration'. In this respect, this task compares favourably to the discussion-group tasks, while also yielding much more positive results than the collaborative translation task where, it will be recalled, only one posting (a triggering event) was classified as cognitive. However, given that only 35.8% of all messages for the cooperative evaluation task were classified as cognitive (see last paragraph), it seems that by and large groups focused in their discussions on administrative aspects of the task.

The 97 messages classified as non-cognitive were coded using the four categories employed in the evaluation of similar postings in Section 4.2 above: 'file sharing', 'deadlines', 'roles' and 'offline meetings'. As before, the largest category of 'non-cognitive' messages was 'file sharing' – 54 instances out of a total of 97, equating to 55.7%. Likewise, the smallest category was 'deadlines' accounting for only three postings out of 151. In contrast to the collaborative translation task, however, there were only four references to offline meetings – all from the same student who wanted to confirm that the group would not, in fact, meet face-to-face. We may conclude from this and from the content of student postings that in the cooperative structure, all small-group activity took place online. This suggests that, where a joint product is required from a student group communicating via asynchronous text-based discussion conferences, the allocation of responsibility for subdivisions of the task to individual students in a cooperative-learning structure enables all group interaction to occur online without recourse to offline meetings.

The second largest non-cognitive category in the cooperative evaluation task was the 'discussion of roles' (25 instances or 25.7%). Most of the communication in this category related to clarification of roles, i.e. to how exactly the different group members should contribute to the final product. Groups J, K and L decided that the student responsible for compiling a particular evaluation report would also take responsibility for initiating discussion on that topic by posting his or her initial impressions of the text to be evaluated. This procedure meant that students initiated and led discussion of 'their' texts and summarized the group's comments when compiling the evaluation report. Groups adopting this procedure (J, K and L) also recorded the highest levels of cognitive presence with a majority of messages to their conference areas classified as 'integration' (50%, 100% and 55% for groups J, K and L respectively). From this we may conclude that groups which scored highest in terms of cognitive presence in the conference transcripts were those in which students took individual ownership of evaluation reports from an early stage by initiating and steering discussions of that text.

We may conclude our discussion of the cooperative evaluation task by stating that in contrast to the collaborative-group translation task, all small-group activity occurred online. Thus a cooperative structure was more effective in this case than a collaborative structure in enabling a joint project to be created using asynchronous text-based communication. However, while the amount of cognitive interaction was greater in the cooperative evaluation task than in the collaborative translation task, it was considerably lower than in the whole-class discussion groups discussed in Section 4.1. This supports Graham and Misanchuk's contention that "collaboration in cooperative groups tends to occur primarily in the administrative aspects of the group such as deciding how to divide and assign work among group members" (2004:184) and also underlines Damon and Phelps' argument that cooperative groups may be high on interdependence, i.e. the extent to which they depend on each other to complete the task, but they are low on mutuality, i.e. the extent to which they are truly connected with one

another and participating in discourse which is "extensive, intimate, and connected" (1989:10).

5. Conclusions

We have seen in this article that contrary to Kiraly's contention, social constructivist learning can occur successfully when students are working at a distance from one another and connected via a computer network. However, the type of task structure will have an impact on learners' ability to complete work using asynchronous conferencing tools and to engage in dialogue that is focused on learning rather than administrative issues. Kiraly's assertion, that groups of students need to meet physically and "discuss their work in face-to-face dialogue" (2000:128) applied only in the case of collaborative small-group tasks where whole-group consensus on the final product was required. Discussion groups and cooperative groups, on the other hand, have been shown to successfully conduct their business online without the need to meet in person, with the former also displaying high levels of interaction, mutuality and cognitive activity. The following conclusions may be drawn in relation to the three task structures identified Section 1 of the article.

Discussion groups: On the measurements of group interaction used in this study, the discussion groups scored highest: there were considerably higher proportions of cognitive vs. non-cognitive postings, there was a greater percentage of cognitive messages at the integration level and there were more intermessage references. Furthermore, where a discussion-group structure was implemented, learning-focused discussion took place online and there was no need for students to communicate synchronously. The success of the discussion-group structure may be explained in reference to a study of online group learning by Dirkx and Smith (2004), who found that while online students welcome the opportunity to "share their perceptions and experiences, to be listened to and heard by others" (ibid.:140), what they want ultimately is individual responsibility and personal accountability for their own learning.

Collaborative groups: When small groups of students attempted to implement a collaborative structure, with all members discussing and negotiating all aspects of the joint task, online communication failed and groups sought to meet or communicate offline. This appears to be due to the difficulty of reaching consensus online – particularly where asynchronous text-based discussion is the only channel of communication between group members. This points to the need for synchronous communication – be it real-time chat, telephone or face-to-face meetings – where the joint creation of a group project using a collaborative procedure is required.

Cooperative groups: Our analysis has shown that a cooperative structure, with strict imposition of roles by the course instructor, enhances the ability of groups to complete a joint project online using text-based asynchronous communication. However, instructors and designers should be aware that the allocation of individual responsibility for subdivisions of a larger task in a cooperative approach to group interaction, while increasing the efficiency of the group process, may jeopardize mutuality and the joint construction of knowledge, as students will complete their subsections without the need or benefit of peer interaction. In such a scenario, the instructor needs to stress the importance of intragroup discussion and encourage mutual discovery and sharing of perspectives.

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