

Teacher Language in ESL Face-To-Face and Written Electronic Discussions

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Abstract

This repeated-measures, counter-balanced study reports on a comparison of quantity and quality of one teacher's language in face-to-face (FTF) and written electronic (WE) discussions with advanced English as a Subsequent Language (ESL) students. Transcripts from the two types of discussions were compared for complexity of teacher input and the language functions this input served during the discussions. Analyses show that the teacher contributed more words, more t-units, and longer t-units to the FTF discussions, and his contributions were longer, consisting of more t-units. The teacher's input to the FTF discussions, unlike the WE discussion, created inequality in participation in the whole group. In the WE setting, teacher language encouraged interaction with individual students, while in the FTF setting, it tended to promote interaction with the whole group. Categorization and analysis of the language functions used showed statistically significant differences.

Introduction

This article presents an exploratory study of the teacher's verbal output in written electronic (WE) [1] and face-to-face (FTF) discussions. WE discussions are whole-class discussions in which students and the teacher interact with each other by typing and viewing messages while seated at computers. In contrast, FTF discussions are traditional whole-class discussions wherein participants communicate as one group while seated around a large table in a seminar room. Two research questions are addressed in the following. The first one explores a potential difference in the amount and complexity of language contributed by the teacher in the two types of discussions, and whether the teacher's input created inequality in group participation. *Inequality* in group participation refers to a situation in which group discussions are dominated by one or a few members of the group, rather than being spread out more equally among participants (see, for example, Fitze, 2006; Warschauer, 1996). The

second question examines potential differences in the language functions used by the teacher, that is, the purposes teacher language served in each of the two types of discussions.

Researchers have covered a broad range of issues affecting CALL teaching and learning contexts (see, for example, Hubbard & Levy, 2006; Levy & Stockwell, 2007), but the role of the teacher has received little attention. Although several studies have compared students' behaviour and language in WE and FTF discussions, few have compared the role of the teacher in these discussions, and none of which the authors are aware have made this the main focus of the study. For instance, Chun (1994) and Kern (1995) collected quantitative data comparing student language production in the two types of discussions. Chun (1994) and Kern (1995) found that second language students interacted directly with each other rather than mainly with the teacher, and that students took the initiative, constructed and expanded on topics, and took a more active role in discourse management in comparison with students in FTF discussions. These studies, consistent with other researchers' findings (Kelm, 1992; Slatin, 1998; Sullivan & Pratt, 1996, Warschauer, 1996; Warschauer, Turbee & Roberts, 1996), suggest that while the role of the teacher is usually central in FTF discussions, it is often more peripheral in WE discussions. However, these studies do not offer systematic insight into how the teacher's language production reflects the change in the teacher's role.

Of particular relevance is Kern's (1995) study, in which he included a quantitative assessment of teacher input during the two types of discussions. For instance, Kern found that in one of the two class groups he investigated, Section 1, the teacher took 81 turns (45% of the total number of turns) during the oral discussion, while not contributing to the WE session at all. In Section 2, a different instructor took 44 turns (45% of the turns) in the oral discussion, while taking only 10 turns (4% of the turns) in the WE setting. Moreover, Kern found that in the Section 1 oral discussions, the most common type of instructor input was questions, followed by comments or questions on language and vocabulary, delegations of the floor (that is, selecting the next speaker), and assertions. In the Section 2 oral discussions, the most frequent type of teacher input was assertions, followed by questions, statements with an interrogative adverb appended (for example, *n'est-ce pas?*), and comments or questions on language and vocabulary. In the Section 2 WE sessions, the most common type of teacher input was assertions, followed by questions, and personal opinions. Kern noted that teacher questions in the WE setting tended to focus more on the content of discussion, while in the FTF discussions, teacher questions tended to focus on language and vocabulary issues.

Kern (1995) concluded that the interactions in the oral discussions "largely followed the normal pattern of classroom discourse--teacher question, student reply, and teacher evaluation of the reply (Mehan, 1985)--with few student turns being followed directly by other student turns" (p. 467). Kern noted that this pattern was rare in the WE setting, in which the quantity and variety of student language production was more consistent with that of group interaction studies. According to Kern, group interaction studies show that students typically produce more speech, and more varied speech in peer groups compared with teacher-led groups.

The positive aspects of the WE setting such as increased student participation, more balanced student participation, enhanced interactive language functions in student discourse, and increased lexical range in student language are fairly well-established in the literature, and provide the rationale for why we used the WE setting as a prewriting setting with our students. However, much remains to be investigated about the WE setting, particularly regarding the role of the teacher.

Research on student participation and discourse in WE and FTF discussions suggests three related reasons why the role of the teacher may be minimized in WE discussions. First, since students display more interactive competence in WE discussions (Chun, 1994; Fitze, 2006; Kelm, 1992; Kern, 1995; Slatin, 1998; Sullivan & Pratt, 1996), they seem better equipped to carry on the WE discussion without much teacher intervention. Second, since there is no need for students to take temporally sequential turns (Beauvois, 1992, 1998; Kelm, 1992), the teacher is not called upon to facilitate the discussion by assigning turns (Kern, 1995). Finally, since students' participation tends to be more evenly distributed among group members (Beauvois, 1992, 1998; Chun, 1994; Fitze, 2006; Kelm, 1992; Kern, 1995; Warschauer, 1996), the teacher need not intervene to bridge silences or to encourage quieter students to participate.

In sum, although previous studies have suggested the reasons a teacher's role might be minimized in the WE setting, they focus on a "negative" perspective by emphasizing *lack of quantity* of teacher participation in the WE setting. The majority of previous studies do not explore what sort of teacher language or participation seems to be lacking in qualitative terms, nor do they provide any detailed information about the kind of contributions that the teacher makes in the WE setting. The study described in the following offers a unique contribution by taking a positive stance, investigating and comparing in some detail what the teacher *does* contribute in the WE and FTF settings.

Research Methodology, Participants, and Procedures

The following section describes key components of our exploratory study, including the setting, the student and teacher participants, and the procedures. The study was originally designed to study high-intermediate and advanced ESL students' production in the two discussion environments, and to explore whether students tend to generate more discourse and be more lexically complex in one of the two conference settings given equivalent amounts of time. In addition, the study explored whether students in the WE conferences demonstrated more interactive competence and more balanced participation compared to the FTF conferences. The total number of words that students produced in an equivalent amount of time in the two types of conferences was not statistically significant. The discourse in WE conferences, however, reflected greater lexical range and the students in these conferences produced more discourse demonstrating interactive competence. The study and its methodological procedures are described in Fitze (2006). After data collection for the original study was completed and the student transcripts had been examined, the researchers agreed to study teacher language in the two environments as well. Consequently, at the time

the data were collected, the teacher was unaware that his language production would become an object of study [2].

The study took place over a four-week period of a 14-week Intensive English Program (IEP) at a medium sized Canadian university. The skill-based program offered students one hour a day each of listening, speaking, reading, writing and grammar, five days each week. After consultation with the classroom teachers, data collection for the study occurred during the 9th, 10th, 12th and 13th week of the program, during the students' writing class, where discussions are used regularly to explore a topic as part of pre-writing activities. For data collection, the two classes alternated between FTF and WE discussion settings week-by-week. During the first and third weeks of data collection (weeks nine and twelve in the program), class A was in the WE discussion setting while class B was in the FTF discussion setting. Weeks two and four of data collection (ten and thirteen in the program) engaged class A in the FTF discussion setting, with class B in the WE discussion setting. This counterbalanced design was used to avoid "group" as a confounding variable in comparisons across discussion settings.

Table 1. Data Collection and Topics

Week	Topic	Class A	Class B
1	Modern Medicine/Biotechnology	WE	FTF
2	Cross-Cultural Marriages	FTF	WE
3	The Environment	WE	FTF
4	Professional Sporting	FTF	WE

The 27 student participants in this study were high intermediate-to-advanced English as a subsequent language (ESL) students. They were assigned to two classes (A and B) by the administration of the IELP based on their Michigan Test scores, which averaged from 68.50 to 68.72 at the beginning of the term. The two classes were also approximately balanced in terms of number of students (14 and 13 respectively), gender, native language background, and cultural background.

A teacher had been assigned by the administration to teach the students in each of the two classes during the 14-week program [3]. However, the first author of the study, who was known to the students as one of the teachers in the IELP, arranged to teach the two classes during the four weeks during which data were collected. This was done for several reasons. As the study was originally focused on learner language in the two environments, it seemed important to have one instructor teach both classes in both environments (WE and FTF) to avoid differences that might arise due to different teaching styles. Another important factor was the need to keep teacher language in the two environments as consistent as possible when introducing the topics and facilitating the discussions. For instance, Yagelski & Grabill (1998) argued that different teachers have different styles of leading WE class discussions depending on factors such as their level of computer proficiency, and their attitude towards the use of computers in teaching. If the regular classroom teachers had been leading the discussions, any differences in their styles of leading the two types of discussions, or preference for one discussion environment over the other, might have

introduced uncontrolled variability into the study. By having only one teacher lead all the discussion groups, this variability (that is, this possible threat to internal validity) was eliminated. The teacher/researcher was experienced in teaching ESL writing, had graduate education in TESL, and was experienced leading WE discussions in ESL classes. The teacher intended to keep his language contribution minimal and consistent in both conditions to maximize student participation. In other words, apart from getting the discussion going by restating the assigned topic, the teacher expected to avoid contributing to the discussion, at least within the bounds of what he considered good teaching practice.

As part of the methodology, the regular classroom teachers were closely involved in the planning of the tasks and they attended, but did not participate in the sessions taught by the teacher/researcher. They were actively involved in proposing and selecting the topics based on their knowledge of the students' interests. The topics used in this study were new to the students, within the context of this course, at the beginning of each discussion. All the students underwent training to give them the skills needed to participate effectively in the WE conferences. They received the topic of each conference the day before the conference took place from their classroom teachers who reviewed relevant vocabulary and general meaning with them. All FTF conferences for each class took place in the students' usual classroom, while all WE conferences occurred in the students' usual computer lab. Both types of conferences lasted for 20 minutes of the 50-minute class period. In the remaining 30 minutes of class time, students individually began to draft essays based on the conference discussion. Drafts were to be completed as homework and handed in the following day. The teacher/researcher aimed to facilitate the discussions in both conditions by restating the assigned topic and questions, summarizing students' contributions and offering clarifications if necessary but to restrain himself from offering new ideas or giving examples about the topic. WebCT, used for the WE discussion, provided a log file that could be saved to a disk as a word processing file. The FTF discussions were audiotaped and then transcribed into electronic format. All participant names in both discussions were removed and replaced with a numeric code to preserve participant anonymity.

Instrumentation

The first part of the first research question was to determine if the amount and complexity of teacher [4] participation was equivalent in both types of discussions. To explore this question, the total number of words contributed by the teacher as a percentage of the total number of words contributed by all participants, and the total number of t-units contributed by the teacher as a percentage of the total number of t-units contributed by all participants was calculated for each discussion. These percentages were then used to determine if the amount of teacher participation in the two types of discussions was equivalent. As an additional measure of the amount of teacher input, the average number of t-units per contribution made by the teacher was also compared across discussion settings. Following Beauvois' (1998) definition of the term *message* and Kern's (1995) definition of the term *turn*, which both correspond to our use of the term *contribution*, a *contribution* in the WE discussions was defined as the totality of what the teacher wrote before pressing the send

key. For FTF discussions, a *contribution* was defined as everything said by the teacher in one conversational turn.

To explore the second part of the first research question--the potential effect of the teacher's input on equality in the group discussions--the number of words contributed by each participant during each discussion was used to calculate Gini coefficients for each discussion. Gini coefficients are measures of inequality that yield a value between 0 (that is, no inequality) and 1 (that is, maximum inequality). For an explanation of how Gini coefficients are calculated, see Koide & Shumway (1998). For each discussion, Gini coefficients were calculated based on the participation of the entire group, and based on the participation of only the students (that is, not including the teacher's input). These Gini coefficients were then used to determine if the addition of the teacher's input to the students' input tended to create greater inequality in participation for the groups as a whole.

Two measures were used to explore the complexity of the teacher's language in the two discussion settings. First, the standardized type-token ratio of the entire teacher input for each discussion was calculated and compared across discussion settings. Type-token ratios are a measure of lexical complexity reflecting the number of unique words per number of running words in a document (Scott, 2006). Higher type-token ratios correspond to more lexical complexity. Standardized type-token ratios were used in this study to accommodate the unequal lengths of the documents being compared (Scott, 2006). Since the smallest number of words in any single conversational turn used by the teacher during one of the discussions in this study was 10 words, the standardized type-token ratios were calculated based on 10 word intervals. The second measure of the complexity of teacher language used in this study was t-unit length. In general, longer t-units correspond to greater syntactic complexity because longer t-units indicate sentences with more subordination (Hunt, 1965; Vavra, 2000).

To determine if there was a difference in the functions of language used by the teacher in the two types of discussions, the teacher's t-units were coded for language function. The coding instrument, an elaboration of Chun's (1994) framework, is summarized in the [Appendix](#), which also contains examples of each function of language the teacher used taken from the data collected in this study. After the teacher's input [5] was coded, the numbers of teacher t-units representing each language function were then converted to percentages of the total number of teacher t-units in that discussion. Percentages rather than raw numbers of t-units were used to analyze the teacher's language functions across discussion settings because percentages better reveal how useful and appropriate a particular language function was to the teacher in a particular type of situation. Rather than revealing *how many times* the teacher used a particular language function in a given discussion, percentage scores reveal what *proportion* of the teacher's input consisted of a particular function, rather than another language function, or nothing at all.

Assumptions and Limitations

Since this exploratory study investigated only one teacher, the results of this study are not intended as predictive of how all ESL teachers would behave when leading pre-writing discussions in FTF and WE settings; instead, this study provides a telling picture of one teacher's verbal behaviour in the two types of discussions. It raises questions about how teacher talk in the two different environments relates to the pedagogical context of a class and impacts on students' behaviour. While teachers may behave differently in the two types of discussions depending on their teaching style and their pedagogical objectives for the activity, a clearer understanding of potential behaviours may provide helpful feedback for teachers as well as teacher educators preparing student teachers. Teachers may find that their experiences are similar when they are faced with leading pre-writing discussions in FTF and WE settings. As shall be discussed in the conclusions to this paper, the results of this study are consistent with the results of previous studies available (see, for example, Kern, 1995; Sullivan and Pratt, 1996).

As mentioned, this study was exploratory and employed a participant-observation research method in which one of the authors also engaged in the role of classroom teacher, leading all of the discussions. Unlike other studies following this method, however, the decision to study teacher language was made after the data were collected, thus minimizing the potential for teacher bias. The methodology allowed the authors to draw on the teacher's insights into his experience of the discussions (that is, what his intentions were at the time) when coding the teacher's input for language function. Consequently, the validity and reliability of the coding was deemed to be dependent on the teacher/researcher's careful examination of the transcripts, and thoughtful deliberations based on post lesson reflections about his experience in the discussions rather than on a measure that objectifies agreement, such as inter-rater reliability.

Finally, one additional measure was taken to avoid, or at least mitigate, potential bias in the way the research questions were framed. All research questions were posed non-directionally. This meant that the researchers made no *a priori* predictions about whether the means for any given measure would be higher in the WE or FTF setting. The decision to pose all research questions non-directionally is further supported by the absence of related studies in the literature.

Comparing the Teacher's Discussion Participation

In this section, we present the results of our analyses of the transcripts. The first research question dealt with the amount of teacher participation, that is, whether the teacher participation was equivalent in both types of discussions, and whether the addition of the teacher's input to the students' input tended to create greater inequality of participation in one or both of the two types of discussion settings. Each part of this question is addressed in turn.

To investigate if there was a difference in the quantity of input generated by the teacher in the two types of discussions, comparisons of the teacher's participation as a percentage of the total participation were made across discussion settings. As mentioned, the teacher leading the discussion groups intended to contribute as little as possible in all discussions. However, analysis of the transcripts clearly shows a difference in the quantity of teacher participation across discussion settings. A summary of the data is presented in Table 2.

Table 2. Comparison of Amount of Teacher Participation across Discussion Settings

Week	% T-Units		% Words		T Units/Contribution	
	WE	FTF	WE	FTF	WE	FTF
1	1.7	24.2	1.0	24.5	1.0	2.3
2	5.8	27.5	3.4	27.2	1.0	1.6
3	12.6	28.9	13.6	32.5	1.3	3.1
4	7.5	26.6	7.9	30.0	1.0	2.1
Mean	6.92	26.79	6.50	28.55	1.06	2.30
S.D.	4.51	1.97	5.56	3.47	0.13	0.63

Since the research questions were posed non-directionally, two-tailed probability levels were used for the statistical tests. Matched-sample t-tests were chosen to compare the quantity of language contributed by the teacher across discussion settings. This was based on the expectation that if the teacher contributed a lot about a given topic (that is, in a given week) in one discussion setting, the teacher might also tend to contribute a lot about the same topic (that is, in the same week) in the other setting.

As shown in Table 2, the percentage of t-units and words contributed by the teacher, as well as the number of t-units per contribution were all statistically significantly higher in the FTF setting. The t-tests revealed the following results for the teacher's percentage of t-units, percentage of words, and number of t-units per contribution: $t(3) = 14.17, p < 0.001$ (two-tailed); $t(3) = 19.60, p < 0.001$ (two-tailed); and $t(3) = -4.67, p < 0.05$ (two-tailed); respectively. In summary, despite the teacher's intention to minimize his participation equally in both settings, the teacher ended up contributing more words and more t-units in the FTF discussions than in the WE discussions. In addition, in the FTF discussions, the teacher tended to make longer contributions consisting of two or more t-units on average.

The second part of the first research question addressed what effect the teacher might have had on how equally distributed participation was among group members. For instance, if participation were calculated to be evenly distributed among members of the discussion group when teacher input *was not* included in the calculation, would participation still be found to be evenly distributed among group members when the teacher's input *was* considered in the calculation? To find out, two matched-sample t-tests were performed. For each type of discussion, the Gini scores for the entire group (including the teacher) were subtracted from the Gini scores for only the students. This resulted in a single column of difference scores for the WE discussions and a single column of difference scores for the FTF discussions, as shown in Tables 3 and 4 below. Two-tailed one-sample t-tests were then

run on the two sets of difference scores with the null hypotheses being that the mean of each set of difference scores was equal to zero.

Table 3. Calculation of the Influence of the Teacher on Balanced Participation in WE discussions

Week	WE Discussion		
	Gini for Entire Group	Gini for Students Only	Difference
1	0.467	0.438	0.029
2	0.339	0.301	0.038
3	0.413	0.445	- 0.032
4	0.289	0.300	- 0.011
Mean	0.377	0.371	
S.D.	0.079	0.081	

For the WE discussions, the matched-sample t-test revealed no statistically significant difference ($t(3) = -0.35, p > 0.05$; two-tailed) between Gini coefficients for the students only ($M = 0.371, SD = 0.081$), compared with Gini coefficients for the students and teacher combined ($M = 0.377, SD = 0.079$). In other words, the addition of the teacher's input to the students' input in the WE discussions did not tend to create greater inequality of participation in the groups.

Table 4. Calculation of the Influence of the Teacher on Balanced Participation in FTF discussions

Week	FTF Discussion		
	Gini for Entire Group	Gini for Students Only	Difference
1	0.515	0.498	0.017
2	0.495	0.446	0.049
3	0.608	0.578	0.030
4	0.450	0.419	0.031
Mean	0.517	0.485	
S.D.	0.066	0.070	

The same calculation for the FTF discussions shows a different picture. The matched-sample t-test revealed a statistically significant difference ($t(3) = -4.90, p < 0.05$; two-tailed) between the Gini coefficients for the students only ($M = 0.485, SD = 0.070$), compared with the Gini coefficients for the students and teacher combined ($M = 0.517, SD = 0.066$) in the FTF discussions. In other words, the addition of the teacher's input to the students' input in the FTF discussions tended to create greater inequality of participation in the group discussions.

Comparing the Teacher's Language Complexity

To investigate if there was a difference in the complexity of the teacher's language in the two discussion settings, two different measures were used. Standardized type-token ratios were used to assess the lexical complexity of the teacher's input, and t-unit length was used to measure the syntactic complexity of the teacher's language. A summary of the data is presented in Table 5.

Table 5. Comparison of Complexity of Teacher Participation across Discussion Settings

Week	Standardized Type-Token Ratio		Average T-Unit Length	
	WE	FTF	WE	FTF
1	60.00	95.83	4.00	11.67
2	95.00	94.74	4.18	9.26
3	98.00	93.78	7.07	12.11
4	97.69	96.25	6.80	10.42
Mean	87.67	95.15	5.51	10.87
S.D.	18.50	1.11	1.65	1.29

Before examining the statistical test on the teacher's standardized type-token ratios, it will be advantageous to consider the numbers presented in Table 5. In particular, the ratio for week one in the WE setting seems noticeably different from the other reported ratios. This difference reflects the fact that during week one in the WE setting, the teacher only contributed 10 words in three t-units:

What do you mean?
Good question.
What do you mean?

Thus, for this discussion, the teacher contributed 10 words, of which 6 were unique (that is, the type-token ratio of 6/10, or as reported: 60.00).

The two-tailed matched-sample t-test on the standardized type-token ratios of the teacher's input yielded no statistically significant difference between the discussion settings ($t(3) = 0.79, p > 0.05$; two-tailed). This suggests that there was no difference in lexical complexity of the teacher's language in the two different discussion settings. However, this non-significant finding should be interpreted cautiously because of the small number of comparisons, and hence the limited power of the statistical test. A larger number of comparisons would help establish with greater certainty that the teacher's language was of equal lexical complexity in both discussion settings.

The measure of the syntactic complexity of the teacher's input, average t-unit length, yielded a statistically significant difference across discussion settings ($t(3) = 6.34; p < 0.01$; two-

tailed) with a higher mean in the FTF setting. This finding suggests that the teacher's language in the FTF setting was more syntactically complex.

Comparing the Teacher's Language Functions

The distribution of teacher language in the discussions is summarized in Table 6. First, raw scores of the number of t-units contributed by the teacher for each language function, week, and discussion setting are reported. These are followed by, in parenthesis, a percentage score that shows the proportion to which the teacher used each language function in each conference. For instance, in week one, the FTF discussion setting elicited 11 general questions to the entire class from the teacher. Thus, this language function made up 26% of the t-units the teacher contributed to the FTF discussion in Week 1 (that is, $11 / 42 = 26\%$). Due to rounding, individual language function percentages do not always add to 100.

Table 6. Number and Proportion of Language Function T-units by Week and Setting

Language Function	Week 1		Week 2		Week 3		Week 4	
	WE	FTF	WE	FTF	WE	FTF	WE	FTF
1. General questions to entire class	0	11 (26%)	3 (18%)	10 (24%)	11 (37%)	22 (22%)	10 (50%)	16 (24%)
2. Specific questions to individual students	0	0	4 (24%)	4 (10%)	5 (17%)	3 (3%)	2 (10%)	2 (3%)
3. Replies to student's general and specific questions	0	0	3 (18%)	0	2 (7%)	1 (1%)	1 (5%)	1 (2%)
4. Requests for clarification	2 (66%)	0	2 (12%)	4 (10%)	2 (7%)	1 (1%)	1 (5%)	1 (2%)
5. Giving feedback to others	0	0	2 (12%)	0	2 (7%)	3 (3%)	1 (5%)	2 (3%)
6. Statements to expand on a topic	0	8 (19%)	0	5 (12%)	6 (20%)	27 (27%)	2 (10%)	19 (29%)
7. Statements to clarify a student's position	0	12 (29%)	0	19 (45%)	0	16 (16%)	0	14 (21%)
8. Statements that clarify topic or task	0	0	0	0	0	13 (13%)	0	0
9. Meta-communications	1 (33%)	10 (24%)	2 (12%)	0	2 (7%)	8 (8%)	1 (5%)	6 (9%)
10. Other	0	1 (2%)	1 (6%)	0	0	5 (5%)	2 (10%)	1 (2%)
TOTAL TEACHER T-UNITS	3 (100%)	42 (100%)	17 (100%)	42 (100%)	30 (100%)	99 (100%)	20 (100%)	62 (100%)

Figures 1 and 2 show the proportion of the teacher's input by language function during the FTF and WE discussions. The mean of the percentage scores for language function for the four discussions in each discussion setting is reported in the pie charts. For instance, Figure 1 shows that general questions to the entire class made up, on average, 24% of the teacher's discourse in the FTF setting. This figure was obtained by summing the percentage scores for that language function and discussion setting and dividing by 4 (that is, $[26\% + 24\% + 22\% + 24\%] / 4 = 24\%$). The Figures are labelled with the type of language function represented,

followed by the mean of percentage scores for that type of language function. The percentages scores in the figures do not equal 100 due to rounding.

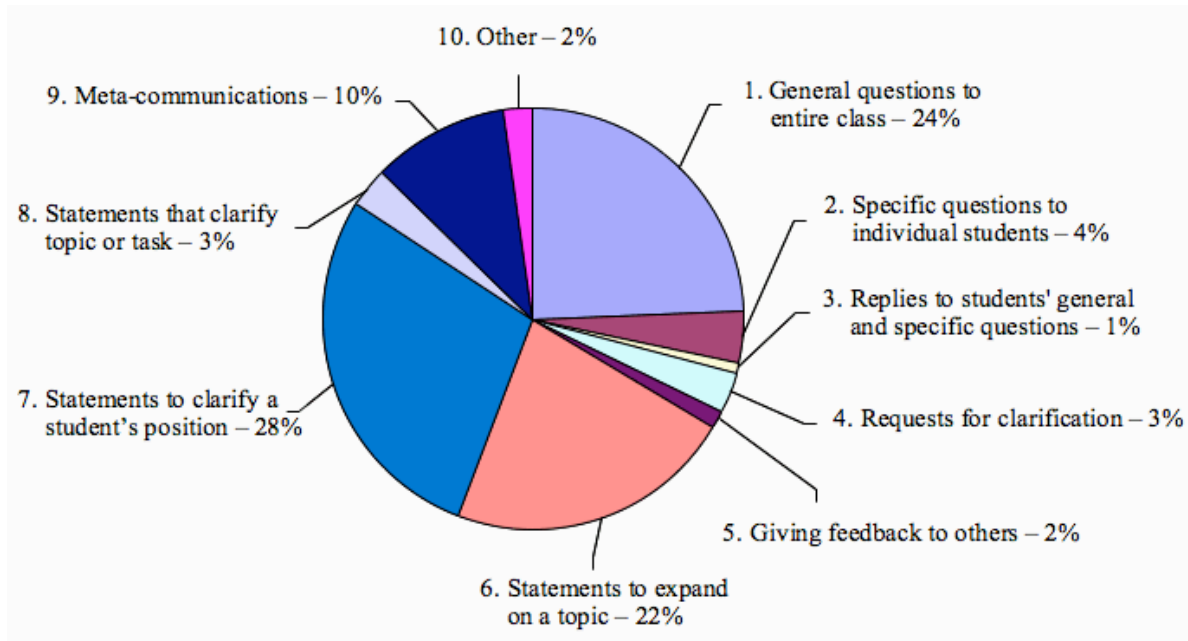


Figure 1. Proportion of teacher discourse by language function in FTF discussions

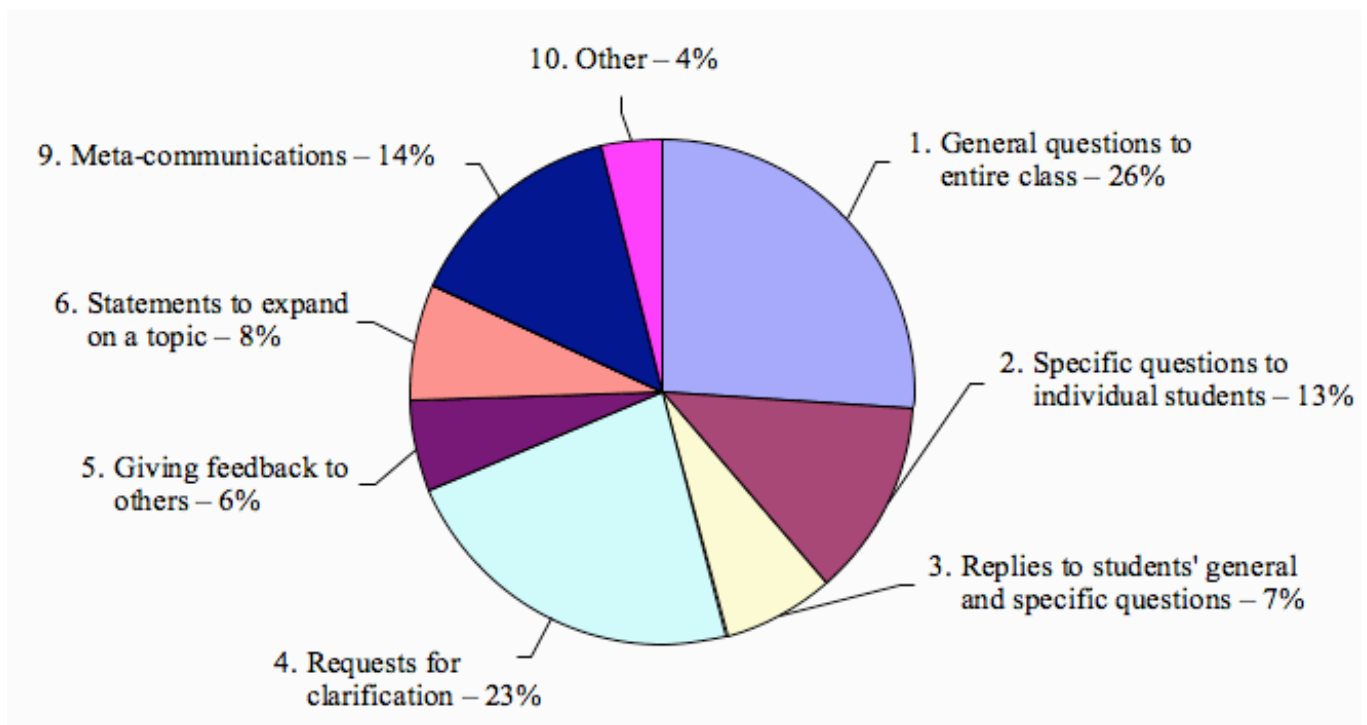


Figure 2. Proportion of teacher discourse by language function in WE discussions

To test differences in teacher language functions across discussion settings statistically, the percentage scores in the WE discussions were subtracted from the percentage scores in the FTF discussions week-by-week, resulting in a single column of difference scores. A two-tailed matched-sample t-test was then run on the difference scores with the null hypotheses being that the mean of difference scores was equal to zero. Two-tailed tests were chosen for all comparisons of teacher language function because, due to the exploratory nature of this study, and the non-directional nature of the research questions, no *a priori* predictions were made about which setting would have higher mean scores for any language function. Results of the t-tests are presented in Table 7. Two-tailed *p* values of less than 0.05 are reported as statistically significant and indicated with an asterisk.

Table 7. Comparison of Teacher Language Functions across Discussion Settings

Language Function	<i>t</i> (<i>df</i> = 3)
1. General questions to entire class	- 0.14
2. Specific questions to individual students	- 2.59
3. Replies to students' general and specific questions	- 1.73
4. Requests for clarification	- 1.24
5. Giving feedback to others	- 1.65
2 to 5 combined (Interaction between the teacher and individual students)	- 3.52*
6. Statements to expand on a topic	4.71*
7. Statements to clarify a student's position	4.51*
8. Statements that clarify topic or task	1.00
9. Meta-communications	- 0.94
* <i>p</i> < 0.05 (two-tailed)	

Comparisons of the teacher's language functions will proceed in the order they have been presented in Table 7. Note that unlike the figures, Table 7 contains a language function that is an aggregate of language functions 2 to 5 (that is, interaction between the teacher and individual students). Categories 2, 3, 4 and 5--*specific questions to individual students, replies to students' general and specific questions, requests for clarification, and giving feedback to others*--can be seen as making up a larger category involving direct interaction between the teacher and individual students. As a result, after being considered separately, these measures will be considered together as an aggregate measure.

In both types of discussions, *general questions to entire class* made up a substantial proportion (that is, about one quarter) of the teacher's input. The t-test revealed no statistically significant difference between the discussion settings. Given that this type of utterance made up, on average, approximately one-quarter of the teacher's participation in both types of discussions, it is evident that in comparison with using another language function, or contributing nothing at all (that is, proportionally), this language function was liberally used by the teacher in both discussion settings.

The t-test revealed no statistically significant difference in the proportion of *specific questions* from the teacher to *individual students*, even though the mean in the WE setting was clearly higher than the mean in the FTF discussion setting. In addition, the means were either the same (that is, both 0%) or higher in the WE discussion setting for each week of the study. However, it is interesting to note that if we had been able to predict that the teacher would ask proportionally more questions to individual students in the WE discussion setting, and used a one-tailed t-test, the difference would have been statistically significant ($t(3) = -2.59, p < 0.05$; one-tailed). As a result, although the methodology of this study does not allow us to report this difference as statistically significant, future studies may want to test the hypothesis that compared to FTF discussions, the teacher will tend to pose a proportionally higher number of questions to individual students in the WE discussion setting.

Similar to the language function just considered, the t-test revealed no statistically significant difference in the proportion of times the teacher provided *replies to students' general and specific questions* in the two discussion settings. However, again, inspection of the means suggests a noticeable difference in the proportions of this language function across discussion settings. In addition, for each week of the study, the percentage scores for this language function were higher in the WE discussion setting than in the corresponding week for the FTF discussion setting. Nevertheless, the t-test did not reach statistical significance, likely because of the considerable amount of variance in the scores within the WE discussion setting. Although examination of the means suggests that the teacher replied to students' general and specific questions proportionally more in the WE discussions, the t-test analysis does not support this interpretation.

The next category of language functions related to the previous two is *requests for clarification*. Like the measure just discussed, the overall mean for this language function in the WE discussion setting was quite a bit higher than the mean in the FTF setting; and for each week of the study, the means were higher in the WE setting. However, the t-test failed to indicate a statistically significant difference. Again, the non-significant result can be attributed to the large amount of variance in means between weeks of the study within settings. Although the means suggests that the teacher requested clarification proportionally more in the WE discussions, the t-test provides no reason to accept this conclusion.

The final measure related to the previous three is *giving feedback to others*. The overall mean for this measure was higher in the WE than in the FTF discussion setting; and for each week of the study, the means were either the same (that is, both 0%) or higher in the WE discussion setting. However, the t-test failed to reach statistical significance. Once again, the t-test provided no formal statistical evidence to reject the null hypothesis and conclude that discussion setting had a consistent differentiating effect on the proportion of times the teacher gave feedback to individual students.

As mentioned above, the four previous measures can be considered together to form a larger category: *interaction between the teacher and individual students*. For instance, all four of these language functions involve the teacher addressing an individual student rather than the

group as a whole. To obtain means for this combined measure, the mean percentage scores of the four constitutive measures for each week of the study and discussion setting were summed before the t-test was performed. The t-test revealed a statistically significant difference between the WE ($M = 48.26\%$, $SD = 20.69\%$) and FTF ($M = 9.20\%$, $SD = 7.81\%$) discussion settings, with the higher mean in the WE discussion setting. This result suggests that in the WE setting, the teacher interacted directly with individual students proportionally more than in the FTF setting.

The next measure in Table 5 is *statements to expand on a topic*. The t-test revealed a statistically significant difference between the two discussion settings with a higher mean in the FTF setting. This result suggests that in comparison with using another language function, or contributing nothing at all, in FTF discussions, the teacher was much more likely to contribute his own ideas to expand on the topic than in WE discussions.

The next measure, *statements to clarify a student's position*, was used quite extensively by the teacher in the FTF discussions, but not at all in the WE discussions. The t-test yielded a statistically significant difference across discussion settings, suggesting that, proportionally, the teacher was much more likely to clarify students' positions to the group during FTF discussions.

Like the previous measure, the language function *statements to clarify the topic or task* was used by the teacher in the FTF discussions, but not at all in the WE discussions. In fact, this language function was used only in one week of the study in the FTF discussions (that is week 3). The t-test yielded no significant difference between discussion settings, suggesting that there is no reason to suspect that the teacher was proportionally more likely to clarify the topic or task in one discussion setting compared with the other. Indeed, at least in part because of the procedures followed in this study--the topic and task were made clear to the students before the discussions began--the teacher very rarely used this language function in either type of discussion.

Overall, the teacher used the language function *meta-communications* proportionally slightly more frequently in WE discussions. However, during some weeks of the study, the teacher used this language function proportionally more in the WE setting (that is, weeks 1 and 2); and in other weeks of the study, proportionally more in the FTF setting (that is, weeks 3 and 4). The t-test yielded no statistically significant difference between discussion settings. These results imply that there was no consistent difference in how the teacher used meta-communications proportionally in one discussion setting compared to the other.

Discussion and Conclusions

Although the teacher intended to minimize his participation equally in both discussion settings, the FTF setting elicited a statistically significantly higher percentage of words and t-units from the teacher. Similar observations have been noted in other studies (Beauvois, 1992, 1998; Chun, 1994; Kelm, 1992; Kern, 1995; Sullivan & Pratt, 1996). Like the teacher

in Sullivan and Pratt's (1996) study, in an effort to get students to participate, the teacher in this study ended up dominating the FTF class discussions.

The statistical analysis of Gini coefficients revealed that when the teacher's input was considered in addition to the students' input, participation patterns in FTF discussions became more unbalanced to a statistically significant degree. On the other hand, the addition of the teacher's comments to the WE discussions did not affect, to a statistically significant extent, the degree to which participation was balanced among participants. Although the teacher attempted to contribute as little as possible in both types of discussions, he contributed so much more to the FTF discussions that his input created considerably more inequality in participation in the group as a whole.

Although data analyses did not show a statistically significant difference in the lexical complexity of the teacher's input in the two discussion settings, the teacher's input in the FTF discussions tended to be more syntactically complex. In particular, the teacher's t-units in the FTF discussions tended to be longer, involving more subordination. In addition, analyses revealed a statistically significant difference in the length of the teacher's contributions: The teacher's contributions to the FTF discussions were longer, consisting of more t-units.

The results discussed so far only tell a part of the story about differences in the teacher's participation in the two different discussion settings. To get the rest of the story, and to begin to suggest reasons why the amount and complexity of teacher participation was different in the two settings, it is necessary to consider the functions of language used by the teacher in the two discussion settings. As a result, we will return to discuss differences in the amount and complexity of teacher language after considering differences in the teacher's language functions (see the [Appendix](#) for a description).

No statistically significant differences were found in the teacher's propensity to pose general questions to the entire class, to make statements to clarify the topic or task, or to make meta-communications. However, before moving on to discuss the statistically significant differences in the teacher's language functions, it is worth pausing to point out two important issues regarding the teacher's use of the language functions just mentioned.

First, with respect to the language function *meta-communications*, the teacher never had to delegate turns in the WE setting, but he did feel the need to do so several times in two of the four FTF discussions. This role for the teacher has been discussed in other studies (for example, Kern, 1995). This finding is not surprising because of differences in the formal structure of interaction in the two types of discussion settings: In WE discussions, there is no need for students to take temporally sequential turns; and hence, no need for the teacher to decide whose turn is next.

Second, regarding *statements to clarify the topic or task*, as was mentioned, the teacher made such statements only in the FTF setting during week three of the study. As mentioned already, the low frequency of this language function was likely because the topics and tasks

were made very clear to the students before the discussions began. However, at the very beginning of the FTF discussion in week three, the students insisted that the teacher further clarify the topic. This was understandable given that the topic to be discussed in week three, which was about the environment (see Table 1 and [Appendix B](#)), was stated broadly, and may have been difficult to narrow down for discussion and subsequent writing. However, it is interesting to note that for the same week and topic in the WE setting, the students were able to proceed with the discussion without similar clarification from the teacher.

At this point, we can only speculate as to why this might have been the case. One possible explanation relates to differences in the way communication occurs in the two different settings. For instance, in the FTF setting, at least some of the group members felt the need to begin with a more narrowed understanding of the topic to be discussed. They may have felt that to interact effectively as a group, they needed to clearly establish what would constitute on-topic and off-topic discourse--so that the group members could all be "on the same page," as it were, with respect to the topic. On the other hand, since conversations in the WE setting tend to follow multiple interleaved parallel threads (Herring, 1999; Simpson, 2005; Smith 2003), it may have been easier for students to begin discussing the complex topic in the WE setting--following their own threads--without first trying to narrow the parameters of discussion.

We now turn to the three statistically significant differences found in the teacher's language functions across discussion settings. A difference was found in the teacher's tendency to interact directly with individual students. In the WE setting, the teacher posed or replied to questions, requested clarification, or gave feedback to individual students proportionally more than in the FTF setting. In other words, in WE discussions, the teacher tended to interact with individual members of the group; while in FTF discussions, he interacted with the group as a whole, rather than with individual students. This finding is consistent with Kern's (1995) finding that in the WE setting in section 2, "9 of the instructor's 10 turns were addressed to specific students in response to their statements or questions" (p. 468).

This tendency of the teacher to interact with individual students in the WE setting, but rarely in the FTF setting may reflect a subconscious teaching strategy. It may have occurred because the teacher felt that in the FTF setting, in the context of this whole-class activity, interacting directly with individual students, particularly less orally proficient students, would tend to "center them out", or "put them on the spot," perhaps embarrassing them. No parallel situation occurred in the WE discussions, where formal aspects of the setting seemed to make interaction with individual students, even the less proficient students, less threatening. The teacher sensed that in the WE setting, when interacting with an individual student, the student likely did not feel singled out as he or she composed a response.

A statistically significant difference was also found in the extent to which the teacher contributed his own ideas to the two types of discussions. The teacher contributed his own ideas to the discussions proportionally more in the FTF setting. This result is somewhat surprising given that the teacher made a special effort not to do so, but underscores the finding of increased teacher participation in the FTF setting reported above. As mentioned,

previous research has also found increased teacher participation in the FTF setting compared with the WE setting. For instance, Sullivan and Pratt (1996) commented that in the FTF setting, in an effort to get students to participate, the teacher ended up getting more and more drawn into the discussion. Although in Sullivan and Pratt's (1996) study it is not possible to know to what extent this involved the teacher contributing ideas about the topic; in this study, getting drawn into the discussion definitely included offering more ideas about the topic.

The final area in which there was a statistically significant difference in the language functions used by the teacher was the proportion of times the teacher made statements to clarify a student's position. In fact, on average, the teacher used this language function 28% of the time in the FTF discussions and not at all in the WE discussions. Like the language function discussed above, the teacher tended to clarify or paraphrase students' assertions to keep the conversation going. It was the teacher's judgement that repeating what a student had just said would suggest to other group members that this was a statement worthy of further discussion and input. Additionally, since the students involved in the discussions were from a variety of native language backgrounds, it was easier for the teacher to understand their various non-standard oral patterns (that is, pronunciation, stress, rhythm, and intonation) than it was for the students to understand each other. Thus, the teacher used this language function when he felt it was necessary to clarify to the group what a student had meant by his or her statement. On the other hand, since communication in the WE discussions did not take place in the oral mode, difficulties with oral proficiency were not an issue.

The statistically significant differences in the teacher's language functions across discussion settings also helps explain why the teacher's input was more syntactically complex and consisted of more t-units per contribution during the FTF discussions. When the teacher summarized students' statements or expressed his own ideas about the topic--language functions that the teacher used statistically significantly more during the FTF discussions--these contributions tended to consist of multiple t-units that were relatively long in number of words per t-unit (that is, more syntactically complex).

The review of the literature above suggests three reasons why the role of the teacher might be lessened in WE discussions. After considering differences in the teacher's language functions in the two discussion settings, we can suggest three additional reasons. First, in the WE setting, students were better able to proceed with the discussion without appealing to the teacher to clarify what might constitute off-topic and on-topic discussion. As a result, in the WE setting, the teacher did not get involved in discussions regarding what was meant by the topic, and how the students should proceed. Second, in contrast to the FTF setting, the teacher did not tend to repeat or paraphrase students' statements in the WE setting. There was no need for the teacher to try to clarify students' pronunciation for the group. In addition, the teacher did not feel the need to bridge silences or to keep the conversation going by reiterating salient points made by students. Finally, the teacher felt less need to contribute his own ideas about the topic in the WE setting. This was likely due to the combination of factors that made the students better able to manage the discussion by

themselves in the WE setting. The teacher did not feel the need to motivate discussion by contributing his own ideas during awkward silences that can occur in a FTF discussion.

Implications for Further Research

Although this exploratory study recounts the experience of only one teacher, wherever possible, commonalities in the experience of the teacher in this study with teachers in previous studies have been pointed out. Some differences with previous research can also be noted. For instance, as discussed in the review of the literature, Kern (1995) found that teacher questions in the WE setting tended to focus more on the content of discussion, while in the FTF discussions, teacher questions tended to focus on language and vocabulary issues. In contrast, in this study, the teacher tended to focus on the content of discussion in both discussion settings. As a result, it appears that the teacher's behaviour in the two discussion settings depends at least in part on the teacher's style and pedagogical objectives.

Additional research is necessary to begin to develop a theoretical model of the teacher's role in WE discussions. In particular, more data are needed on a variety of teachers working with diverse student populations, ideally in contexts where the teachers are blind to the research questions under investigation. However, at this point, it seems safe to say, along with Beauvois (1992, 1998), Chun (1994), Kelm (1992), Kern (1995), Slatin (1998), Sullivan & Pratt (1996), Warschauer (1996), and Warschauer et al. (1996) that the WE setting serves a democratizing function. It tips the balance of participation patterns towards the students and away from the teacher, allowing students to take more control of the discourse. Future studies might attempt to address questions such as: How does what the teacher contributes during WE discussions influence student behaviour and discourse? To what degree *should* teachers contribute to WE discussions, and what sort of teacher input is most effective in achieving given pedagogical objectives.

Notes

[1] Written electronic (WE) discussions are synchronous text-based computer-mediated communications (CMC). The term is used to underline the more formal context of the classroom discussions compared to many out-of-class "chat" experiences students may have experienced previously.

[2] Consent to study the data was obtained.

[3] To be referred to as "regular classroom teacher" in the following.

[4] As discussed, one of the researchers led all the discussion discussions in this study, and as such, took on the role of teacher. Since this study is about the language and role of the teacher in the two types of discussions, for the sake of clarity, we will refer to the participation of the researcher in the discussions as "teacher" participation.

[5] For stylistic reasons, we refer to the teacher's "language," "statements," "input," and "responses," etc. However, it should be noted that all coding was done after the teacher's discourse was broken into t-units. The term "contributions" is reserved to refer to the entirety of one of the teacher's conversational turns, consisting of one or more t-units.

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Appendices

Appendix A. Coding Teacher Discourse

This appendix lists and describes the language functions used to code the t-units contributed by the teacher during the discussions and, where necessary for clarification, gives examples extracted from our data. The functions identified reflect an elaboration of the framework in Chun (1994).

1. *General questions to entire class.* The teacher used this language function to orient students to the topic and to elicit participation from the class as a whole. An example is the teacher's question, "Does anyone know anyone who has a cross cultural marriage?"
2. *Specific questions to individual students.* This involved the teacher probing individual students to go deeper into their ideas, or to consider the opposing viewpoint. An example is when a student states that professional sports influence children, and the teacher asks, "How does it influence children?"
3. *Replies to students' general and specific questions.* When a particular student addressed a question either to the group as a whole or to the teacher in particular, and the teacher responded, the teacher's response was coded as this language function.
4. *Requests for clarification.* The teacher's input was coded as a request for clarification only when the teacher asked a specific student to clarify what he or she meant by their statement. As such, this language function differed from *specific questions to individual students* because it referred only to a unique type of question. In our data, such requests included the teacher's questions "What do you mean?" "Can you be more specific?" and "Can you give an example?"
5. *Giving feedback to others.* This referred to statements made by the teacher to an individual student as feedback on his or her input, and was limited to situations in which the feedback involved only agreement, disagreement, or understanding. Examples from our data include the statements, "I agree." "No, well, it depends." and "I see."
6. *Statements to expand on a topic.* When the teacher contributed his own ideas about the topic, his statements were coded as this language function.
7. *Statements to clarify a student's position.* The teacher's input was coded as this language function when the teacher essentially repeated or rephrased what a student had just said to clarify the statement to the group. This language function differed

from *requests for clarification* because *statements to clarify a student's position* referred only to statements that repeated or paraphrased, not questions to which the teacher expected some type of response. For instance, in response to a student's statements, "We should think about what we are doing. We are creating a clone it is damage. Before we make a clone we should think about the consequence.", the teacher attempts to clarify by saying, "so we should think about what the possible negative consequences are before we do anything."

8. *Statements to clarify the topic or task.* This language function essentially involved the teacher clarifying what students were supposed to do, or clarifying the topic at hand. An example of the teacher's attempt to clarify the topic is the statement, "I want you to discuss the good points and the dangers of technology and then decide what you think is more true that technology creates problems or that technology solves problems, and to give some examples of that."
9. *Meta-communications.* *Meta-communications* were the teacher's communications about the communication. Such statements involved the teacher delegating conversational turns, explicitly mentioning that someone had raised a good point or asked a good question, or congratulating the group on their efforts. This language function differed from *giving feedback to others* because *meta-communications* did not involve the teacher specifically expressing agreement or disagreement. Examples from our data include the teacher's contributions, "Can we hear from (the students) down here (at this end of the table) please." "There's a number of problems that have been identified here." "Well I think we should end our discussion there and start writing about that." and "Good job everyone."

Appendix B. Topics and Teacher's Script

Week 1 - Modern Medicine/Biotechnology

Once we have mapped the human genome, we can use our knowledge to control the sort of babies we have. We will be able to purchase medical treatments that will ensure our babies are healthy, "normal" in appearance, and intelligent. Biotechnology can be used to detect a genetic predisposition to certain diseases, and perhaps, to manipulate the DNA into a more desirable sequence. Biotechnology can also be used for more conventional purposes such as increasing food production and supply. Other possibilities include growing custom organs for transplant patients. What possible effects on society could this technology have? Should limits be placed on the use of this technology?

Week 2 - Cross-Cultural Marriages

The invention of the airplane and communication technologies have revolutionized travel and made the world a smaller place. People are coming together in ways that were never previously possible. These new opportunities for travel and communication have accompanied an increase in marriages among people from different cultural backgrounds. How do you feel about cross-cultural marriages? What may be the advantages and disadvantages of cross-cultural marriages for couples and for their children? Do you think

cross-cultural marriages can work? Can a cross-cultural marriage be as successful as a marriage of people from the same culture? Under what conditions can and do these marriages work?

Week 3 - The Environment

We have heard much lately about the greenhouse effect. Carbon monoxide in the atmosphere is causing depletion of the layer of ozone that protects us from much of the harmful ultraviolet radiation from the sun. In addition, increased levels of carbon dioxide (as a result of industrial processes) are causing the world's temperature to increase, leading to more water in the atmosphere and more violent storms. Moreover, the population is increasing at an alarming rate. Can we feed, clothe, and provide medical care for all these people? Should governments and countries (continue to) take steps to control population growth? Are we headed for much more poverty and suffering in our world or will our technology solve our problems? What advice do you have for governments who face these problems?

Week 4 - Professional Sporting

Professional sports seem to have great popularity among people from many countries. Although the favoured game may differ, professional sporting events draw huge crowds. One may argue that the significance of professional sports is overrated, and that people would be better served either playing the sport themselves, or engaging in some other pastime. Others point out that professional athletes are outrageously overpaid and that the innocence of sporting has been lost; athletes no longer play for the love of the game, they play for the money. What positive side do you see to professional sporting that might justify its popularity? Do you think that professional sports are overrated or do you see value in these people and events? Explain.