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# Development of a classroom discussion scale for self-assessment purposes by high school students and teachers

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## Abstract

Educators worldwide appreciate the value of discussion in ESL classrooms as a means to support the development of higher thinking skills as well as the language development of ESL students. However, there is a lack of instruments in identifying the main components of classroom discussion. The purpose of this study was to engage ESL high school students at an international campus in the task of developing a scale that would help students self-assess the key components of their classroom discussions. The study generated a 14-item scale with three main components, which are flow of ideas, information processing, and discussion barriers. The study used both orthogonal and oblique rotations of the factors. Cronbach's alpha indicated that the scale was reliable. The development of this scale can be of use for researchers as an additional tool for assessing their learning environments.

***Keywords*****:** *classroom discussion, components, ESL students, high school students, international campus, information processing*

## 1. Introduction

English teachers have many different instructional approaches at their disposal. They can choose to lecture, allow for cooperative learning, do individual work, or used additional strategies to help students to learn and acquire familiarity with the language (Thomas, 2015). A commonly employed method of teaching is the use of discussion in the classroom. However, a question to consider is what are students' perceptions of classroom discussions? Furthermore, what are the key components of discussion as viewed by the students?

The development of a classroom discussion scale is the goal of this study. Prior studies have often addressed classroom discussion from an anecdotal or qualitative viewpoint (Henning, 2005; Henning, Nielsen, Henning, & Schulz, 2008). This study seeks to explore what this literature has indicated quantitatively through determining what factors contribute to a more positive and or negative perception of classroom discussion as viewed not by teachers but by students. The benefits of this approach would provide educators with a tool for measuring and analyzing the quality of the ESL classroom discussion that happens in their institutions.

### 1.1 Defining classroom discussion

Classroom discussion is focused on the development of knowledge in the context of learning using dialogue (Ezzedeen, 2008). There is a clear purpose for a discussion in a class. In other words, it is not a random dialog such as that found in daily social conversation (Thomas, 2010). Discussion can happen between students and teacher or between students (Innes, 2007). The intent of discussion in the classroom is to increase student participation through interaction verbally in the learning environment.

Classroom discussion is in contrast to a more traditional lecture style found in the Asian context (Thomas, 2010). Within Asia, the approach to teaching is often based on the uni-directional transmission of knowledge from teacher to student. This often means a limit to discussion and interaction among students and the teacher. This form of teaching is an expectation of the teacher and even of the students. In other words, dialoging is not a critical component of many classrooms in Asia due to cultural factors.

Classroom discussion is derived from a transactional and even transformational form of teaching (Orenstein & Hunkins, 2009). It is based on the premise that with increased participation,

students become partially responsible for their own and other students learning. The participants of a discussion actively construct their understanding of topics, and this is consistent with a social constructivist view of learning (Schunk, 2012). Therefore, developing ownership in the learning process is a major element of classroom discussion. Classroom discussion could therefore be defined as purposive verbal interaction amongst students and teachers with the goal of developing knowledge and ownership in the topic of discussion.

1.2 Benefits and traits of classroom discussion

Classroom discussion has a direct impact on students' social skills, as well as their cognitive and affective development. In terms of listening skills, classroom discussion is a key strategy as it supports collaborative learning with other students (Brookfield & Preskill, 2005). Students engage with one another through discussion develop their listening skills (Hickman, 2007). The process of discussion also contributes to learning how to communicate clearly and how to develop respect for others, which is important for developing empathy (Brookfield & Preskill, 2005).

Classroom discussion directly engages students' cognitive development through the questioning that happens. The questions that the teacher asks the students can be derived from Bloom's taxonomy in a way that contributes to higher level thinking (Thomas, 2010). The questions need to come from the higher levels of Bloom's Taxonomy in order to stimulate deeper thinking. This means that questions with single answers are appropriate for assessing students' knowledge but not for deepening their thinking and content comprehension. Discussion in the classroom provides opportunities for students to hear what others have to say (Ezzedeen, 2008). In addition, students who participate in classroom discussion often have improved their academic achievement in part due to the process of content reinforcement that happens when discussion takes place (Nelson, 2010). This may support the language acquisition of ESL students as well.

In addition, to general cognitive development, classroom discussion also enhances critical thinking skills (Borich, 2011; Davis, 2013;). Smith, Wood, Krauter, and Knight (2011) found that peer discussion combined with instructor explanation improve students understanding of concepts presented in the classroom. If students are provided with opportunities to discuss ideas in the classroom, this will support the development thinking skills as well as potentially boast their academic performance. It is therefore important to develop ways to identify students' perception of classroom discussion to inform teachers as to how this can take place in the classroom.

Discussion has an impact on a students' affective development, which includes their beliefs and attitudes about various concepts. As students discuss an idea it helps them to develop a tolerance for ambiguity, as consensus is often not met (Brookfield & Preskill, 2005). Students are put into situations in which they are called upon to explore different views (Salemi & Hansen, 2005). This process can help them to see their assumptions, which is valuable in developing sound arguments (Thomas, 2010). Attitudes shift also happen from students listening to each other rather than the teacher as peer input is often perceived as stronger than from a superior (Quinn & You, 2010).

There are many characteristics that are considered necessary in order for excellent classroom discussion to take place. First, it is necessary to prepare students by getting them to complete prior reading of relevant topics (Brookfield & Preskill, 2005; Ezzedeen, 2008). Second, rules must also for a discussion so the students know how to act during as the discussion takes place (Hickman, 2007). Third, the environment of the classroom is also critical. It is recommended that the shape of the classroom needs to be as such so that the students can all see each other, as eye contact is usually considered important when communicating in person (Ezzedeen, 2008). Lastly, the atmosphere of the classroom must be one where there is no fear of criticism (Shafer, 2009).

The traits of the teacher may also be important. The teacher must provide open-ended questions to begin a discussion (Henning, 2005; Henning et al., 2008). They must set the pace and be committed to discussion (Brookfield & Preskill, 2005). The teacher's expertise and ability to summarize a discussion may also be key components of classroom discussion success as these skills serve as a way to bring closure to an interaction (Ezzedeen, 2008; Henning, 2005). The teacher balances enhancing student participation while also deepening the quality of reasoning and

thinking in the course of the discussion (van Drie & Dekker, 2013). For ESL teachers, this need for developing language skills necessitates the development of thinking skills as well.

Davis (2013) provides three principles to use when attempting to encourage discussion. Principle 1 is to orientate students to generate a meaningful talk. This means to determine the overall purpose and expectation of the discussion. In addition, steps must be laid down to ensure class participation by breaking them into small groups if necessary. Principle 2 is to facilitate conversation and encourage participation. This happens through providing students with adequate wait time to formulate answers and or having students write down what they will share to allow them to organize their thoughts. Lastly, principle 3 relates to strategies for correcting mistakes. If students make mistakes, it is critical to provide metacognitive guidance in order to allow the student to discover what might have gone wrong. For example, the use of redirection probes helps with this as the questions the teacher ask can allow the student to realize what happened (Borich, 2011).

Borich (2011) suggest that teachers should share the objectives of the discussion with the students, provide accurate information when needed, summarize, adjust the flow of information, and combine ideas to reach a consensus. These strategies help to maintain the focus and quality of an instruction. By discussion, students' ideas can be incorporated into the learning, which enhances engagement (Everston & Emmer, 2009). This experience of co-creation of the discussion is valued by students (Muller, 2014). For ESL students, the participatory nature of contributing verbal to a discussion is beneficial in developing confidence in speaking.

In an ESL context such as that found in Asia, discussion plays an important in role in developing the English skills of students. Although discussion benefits most students and contexts it is of greater importance in an environment in which students are developing language skills in English. Discussion plays a key role in many forms of language instruction such as content-based instruction in which students learn the target language (such as English) by studying content (such as math science, or history) in the target language (Richards & Rodgers, 2014). This indicates that discussion is both a thinking tool and a means for language acquisition.

## 2. Objectives

The traits of classroom discussion are diverse and primarily based on observation and experience rather than quantitative data. The challenge is testing these various traits and developing a model that can be used to describe students' evaluations their classroom discussions. The aim of this study is to determine which and to what degree students perceive various aspects of classroom discussion.

## 3. Materials and methods

The participants in this study were 127 high school students in grades $10^{th}$, $11^{th}$ and $12^{th}$ who study at an international campus in Thailand. Respondents were selected using stratified sampling based on gender. In terms of class, 28% were sophomores, 10% were juniors, and 61% were seniors. In terms of gender, 55% were male and 44% were female. Due to the international nature of the campus, all of the respondents in this study participate in classroom discussions on a daily basis.

### 3.1 Instrument development

The instrument was developed through an examination of the literature concerning classroom discussion. A bank of items was developed that drew on the different characteristics and traits of classroom discussion as mentioned in the review of literature section of this article. A five point Likert scale was used for assessing each item, ranging from 5 = "Strongly agree", 4 = "Agree", 3 = "Neutral", 2 = "Disagree", and 1 = "Strongly disagree". In all 30 items were developed for the instrument.

### 3.2 Procedure

The instrument was administered by the researcher as well as be other faculty members. Communication was made with the administration of the school(s) participating in this study and the collection of data took place at an agreed time between the researcher and the administration from the sample population. The instrument was distributed and students selected the response that most appropriately reflected their opinion about each statement.

3.3 Data analysis

Exploratory R-type factor analysis was employed in this study. Principal components analysis with both orthogonal and oblique rotation was employed and compared in order to search for components that would describe the characteristics of classroom discussion as determined by the participants of the study. The factor loadings of each individual item and its respective component were computed. The number of components extracted was based on scree plot, parallel analysis, and latent root criterion. A summated scale was developed in order to provide an instrument that measures classroom discussion in other contexts. Lastly, to assess internal consistency of the summated scale, Cronbach's coefficient alpha was calculated.

**4. Results**

For the original model, which includes all 30 items, an inspection of the correlation matrix indicated that 25% of the correlations were above 0.3 and significant at 0.05 level. Bartlett's test of sphericity was significant ($\chi^2$ (435) = 1346.2, $p$ < .01) and indicates that there are no nonzero correlations. The overall measure of sample adequacy was 0.76. The measure of sample adequacy for each item was between 0.56 and 0.85, which are all above the minimum cutoff of 0.5. Table 1 includes all thirty items in the original model with their means and standard deviations.

An initial analysis of the scree plot along with a parallel analysis recommended a 3-component factor. Based on this initial recommendation, factor loadings and communalities were calculated. An orthogonal varimax rotation was used for the interpretation of the factor loadings to reduce cross loadings and maximize the loadings of an item on a component. In general, the factor loadings for the items were above 0.45, which is acceptable. However, items were removed based on low communalities. Sixteen items were removed due to communalities below 0.5, which is considered a general minimum threshold. The process of removal was iterative, which means that each item was remove one at a time and the analysis was repeated. The cumulative variance explained in the initial model was 40% before items were removed. This is below a recommended level of 50% for factor analysis.

4.1 Final model

The final model included 14 items. An examination of the correlation matrix indicated that 30% of the correlations were above 0.30 and significant at 0.05 level. Bartlett's test of sphericity was significant ($\chi^2$ (91) = 487.42, $p$ < .01) and indicates that there are no nonzero correlations. The overall measure of sample adequacy was 0.75. The measure of sample adequacy for each item was between 0.61 and 0.81, which are all above the minimum cutoff of 0.5. Table 2 shows the correlations, means, standard deviations, and reliability of each item.

A parallel analysis and a visual inspection of the scree plot recommended a three-component factor. An orthogonal varimax rotation was used for the interpretation of the factor loadings as the rotation of the results helps to reduce cross loadings while maximizing the loadings of an item on a component. Table 3 shows the rotated results of the factor loadings. The names of the items have been abbreviated but they correspond to the numbers in Table 1.

Component 1 deals with such aspects of classroom discussion as the flow of ideas and prior preparation. Component 2 deals with how information is processed during discussions in the learning context. Discussion supports the learning of concepts, rethinking of ideas, as well as allowing for open discussion. Component 3 is related to barriers in a discussion. Fear of criticism and the expertise of the teacher appeared to be the main barriers to discussion as well as the pace of discussion and the size of the class. For component 3, since it deals with discussion barriers it would be important to reverse code them in the actual use of the scale. The model adopting varimax rotation explained 55% of the variance in the study, which is an acceptable level of explanation.

An oblique rotation of the analysis was examined in order to compare it to the results of the orthogonal rotation. An orthogonal rotation forces the components to be uncorrelated while oblique rotation does not do this. The results indicate almost no difference. This means that regardless of the rotational method the result hold essentially the same. Table 4 is the oblique rotation of the factor loadings.

The Cronbach alpha of the 14 items in the final model was 0.70. This is the minimum acceptable threshold for a scale. The results of the Cronbach alpha are in Table 1. The correlations of

the three components are all low and or insignificant. This means that each component is measuring something distinct about classroom discussion. Table 5 is the correlation matrix of the three components. Lastly, Table 6 is the final scale with means and standard deviations.

**Table 1** Means and standard deviations of items

| | | Means | SD |
|---|---|---|---|
| 1. | Classroom discussion teaches me to respect others | 4.10 | 0.90 |
| 2. | Discussion in the classroom helps me solve problems | 3.92 | 0.94 |
| 3. | I develop a deeper knowledge of content through classroom discussion | 3.96 | 0.84 |
| 4. | I am able to share my opinion during a classroom discussion | 3.83 | 0.96 |
| 5. | I am afraid of being criticized during a classroom discussion | 3.22 | 1.16 |
| 6. | I know what to discuss because I read about the subject before class | 2.89 | 1.17 |
| 7. | It is okay to share different opinions in a class discussion | 4.39 | 0.69 |
| 8. | In my class there are clear directions on how to discuss a concept in the classroom | 3.47 | 1.06 |
| 9. | I will not talk if a discussion is too fast for me | 3.41 | 1.20 |
| 10. | The teacher should summarize different ideas during a discussion | 4.03 | 0.92 |
| 11. | I will not talk if the class is too big | 3.22 | 1.26 |
| 12. | I know what to do during a classroom discussion | 3.69 | 0.93 |
| 13. | It is okay to disagree in a discussion | 4.22 | 0.81 |
| 14. | I learn more when I discuss an idea in class | 4.03 | 0.85 |
| 15. | I like to share my opinion during a classroom discussion | 3.51 | 1.21 |
| 16. | Discussion in the classroom helps me to rethink ideas | 4.03 | 0.86 |
| 17. | I can disagree with my friends during a classroom discussion | 4.06 | 0.75 |
| 18. | I need to see everybody during a classroom discussion | 3.14 | 1.18 |
| 19. | The teacher should encourage discussion in the classroom | 3.99 | 0.85 |
| 20. | Controversial topics are good for discussion | 3.89 | 0.95 |
| 21. | The teacher should explain what to do during a classroom discussion | 4.00 | 0.88 |
| 22. | I understand other people's opinion after a classroom discussion | 3.99 | 0.95 |
| 23. | My teacher's expertise scares me from talking in class | 3.05 | 1.28 |
| 24. | The readings outside of class prepare me to discuss concepts in class | 3.52 | 1.09 |
| 25. | I appreciate opinions that are different than mine because of classroom discussion | 4.11 | 0.76 |
| 26. | I explain my ideas in class | 3.59 | 1.02 |
| 27. | My ideas are used during discussions | 3.27 | 1.06 |
| 28. | I pay attention during discussions | 3.88 | 0.82 |
| 29. | The teachers gives me opportunities to share my ideas | 3.93 | 0.85 |
| 30. | Discussion helps me to understand concepts | 4.14 | 0.79 |

**Table 2** Correlational matrix

| | 5.Fear | 6. Prior reading | 7.Different opinions | 9.Speed | 11.Size | 14.Learn more | 15.Like to share | 16.Rethink ideas | 17.Disagree friends | 18.See all | 23.Expertise | 26.Explain ideas | 27.Ideas used | 30.Learn concepts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5. Fear | 1 | | | | | | | | | | | | | |
| 6. Prior reading | .12 | 1 | | | | | | | | | | | | |
| 7.Different opinions | -.09 | .02 | 1 | | | | | | | | | | | |
| 9. Speed | *.40 | .11 | -.04 | 1 | | | | | | | | | | |
| 11. Size | *.30 | *.21 | -.04 | *.54 | 1 | | | | | | | | | |
| 14.Learn more | -.02 | *.17 | *.40 | -.06 | -.07 | 1 | | | | | | | | |
| 15. Like to share | *-.17 | *.30 | *.30 | -.12 | -.09 | *.38 | 1 | | | | | | | |
| 16.Rethink ideas | -.08 | -.03 | *.33 | .04 | -.02 | *.44 | .16 | 1 | | | | | | |
| 17.Disagree friends | -.15 | -.08 | *.39 | *-.21 | -.07 | *.29 | *.18 | *.35 | 1 | | | | | |
| 18. See all | .03 | *.24 | -.05 | .15 | -.04 | .14 | *.33 | *.21 | .02 | 1 | | | | |
| 23.Expertise | *.25 | .15 | *-.17 | *.35 | *.37 | -.04 | -.05 | *-.21 | *-.20 | .15 | 1 | | | |
| 26. Explain ideas | -.12 | *.35 | .14 | -.04 | -.12 | *.37 | *.53 | *.22 | .12 | *.45 | 0 | 1 | | |
| 27. Ideas used | .03 | *.36 | .05 | .15 | .08 | *.27 | *.41 | .12 | 0 | *.40 | *.2 | *.58 | 1 | |
| 30. Learn concepts | -.05 | -.10 | *.42 | .04 | -.07 | *.50 | *.18 | *.49 | *.36 | .12 | -.09 | *.16 | *.21 | 1 |
| Means | 3.22 | 2.89 | 4.39 | 3.41 | 3.22 | 4.03 | 3.51 | 4.03 | 4.06 | 3.14 | 3.05 | 3.59 | 3.27 | 4.14 |
| SD | 1.16 | 1.17 | 0.69 | 1.20 | 1.26 | 0.85 | 1.21 | 0.86 | 0.75 | 1.18 | 1.28 | 1.02 | 1.05 | 0.78 |
| Alpha | .70 | .71 | .68 | .71 | .70 | .66 | .66 | .70 | .70 | .66 | .71 | .70 | .70 | .70 |

**Table 3** Orthogonal rotation of factor loadings

| Item | Component 1 | Component 2 | Component 3 | Communalities |
|---|---|---|---|---|
| 26. Explain ideas | .81 | | | .44 |
| 27. Ideas used | .77 | | | .44 |
| 15. Like to share | .68 | | | .50 |
| 18. See all | .66 | | | .68 |
| 6. Prior reading | .62 | | | .60 |
| 30. Learn concepts | | .79 | | .58 |
| 16. Rethink ideas | | .73 | | .46 |
| 7. Different opinions | | .70 | | .44 |
| 14. Learn more | | .67 | | .45 |
| 17. Disagree friends | | .64 | | .72 |
| 11. Size | | | .77 | .54 |
| 9. Speed | | | .66 | .57 |
| 5. Fear | | | .66 | .62 |
| 23. Expertise | | | .60 | .60 |
| SS loadings | 2.70 | 2.69 | 2.26 | |
| Proportion of variance | 0.19 | 0.19 | 0.16 | |
| Cumulative variance | 0.19 | 0.39 | 0.55 | |

**Table 4** Oblique rotation of factor loadings

| Item | Component 1 | Component 2 | Component 3 | Communalities |
|---|---|---|---|---|
| 26. Explain ideas | .82 | | | .72 |
| 27. Ideas used | .77 | | | .62 |
| 15. Like to share | .68 | | | .58 |
| 18. See all | .66 | | | .44 |
| 6. Prior reading | .63 | | | .44 |
| 30. Learn concepts | | .80 | | .62 |
| 16. Rethink ideas | | .74 | | .54 |
| 7. Different opinions | | .71 | | .50 |
| 17. Disagree friends | | .65 | | .46 |
| 14. Learn more | | .64 | | .57 |
| 9. Speed | | | .83 | .68 |
| 11. Size | | | .78 | .60 |
| 5. Fear | | | .66 | .44 |
| 23. Expertise | | | .58 | .45 |
| SS loadings | 2.72 | 2.67 | 2.26 | |
| Proportion of variance | .19 | .19 | .16 | |
| Cumulative variance | .19 | .39 | .55 | |

**Table 5** Correlation matrix of final three components

| | Flow of Ideas | Information Processing | Barriers |
|---|---|---|---|
| Flow of Ideas | 1 | | |
| Information Processing | .26 | 1 | |
| Barriers | .06 | -.15 | 1 |

**Table 6** Final scale

| | Item | Means | SD |
|---|---|---|---|
| 1. | I am afraid of being criticized during a classroom discussion | 3.22 | 1.16 |
| 2. | I know what to discuss because I read about the subject before class | 2.89 | 1.17 |
| 3. | It is okay to share different opinions in a class discussion | 4.39 | 0.69 |
| 4. | I will not talk if a discussion is too fast for me | 3.41 | 1.20 |
| 5. | I will not talk if the class is too big | 3.22 | 1.26 |
| 6. | I learn more when I discuss an idea in class | 4.03 | 0.85 |
| 7. | I like to share my opinion during a classroom discussion | 3.51 | 1.21 |
| 8. | Discussion in the classroom helps me to rethink ideas | 4.03 | 0.86 |
| 9. | I can disagree with my friends during a classroom discussion | 4.06 | 0.75 |
| 10. | I need to see everybody during a classroom discussion | 3.14 | 1.18 |
| 11. | My teacher's expertise scares me from talking in class | 3.05 | 1.28 |
| 12. | I explain my ideas in class | 3.59 | 1.02 |
| 13. | My ideas are used during discussions | 3.27 | 1.06 |
| 14. | Discussion helps me to understand concepts | 4.14 | 0.79 |

## 5. Discussion and conclusion

The results of this study leads to several important conclusions. For one, the main characteristic of classroom discussion is related to the exchange of ideas, the processing of those ideas, and the barriers to discussion. The first two components of exchanging and processing ideas are consistent with how Ezzedeen (2008) defines classroom discussion. Classroom discussion involves sharing ideas, learning new concepts, and being able to express various opinions. This indicates that teachers who wish to move away from passives forms of learning need to consider not just any form of discussion but one in which the movement of ideas happens among the students and the teacher. As such, strictly answering teachers' questions alone may not support this approach of learning. However, for students new to learning English, perhaps all they are able to do initial as they learn the language is respond to a teacher's question.

Due to positive impact of the sharing of ideas, it is critical that discussion take place. The respondents of this study indicated that discussion is about the flow of ideas. This flow of ideas is powerful in shaping the affective development of students (Brookfiled & Preskill, 2005). Furthermore, exposure to new ideas is an opportunity to test assumptions and grow intellectually (Thomas, 2010).

The barriers of discussion found in this study are consistent with the conclusions of Thomas (2010). The size of the class, the pace of the discussion, fear of criticism, and the expertise of the teacher are all clear detriments to discussion. This indicates that a teacher needs to be aware of these potential barriers to discussion and make efforts to alleviate them. Class size can be dealt with by encouraging discussion in small groups (Davis, 2013). Pace of the discussion can be monitored to give students time to think (Schunk, 2012). Criticism can be reduced by showing acceptance of students' positions and even incorrect responses regardless of what was said (Borich, 2011; Shafer, 2009). Lastly, the expertise of the teacher can be overcome by having students talk amongst each other and or have the students discuss topics in which they have more knowledge than the teacher.

Other interesting findings concern the items that were not included in the final model. According to the respondents of the survey, discussion does not need to be led by the teacher asking questions. Furthermore, there were no items in the final model that addressed arguing over opinions and/or disagreeing with the teacher. This may be due in part to the context of the study. In Asia, confrontation is usually avoided and this worldview may have made it difficult for the students to accept unharmonious behavior such as arguing (Thomas, 2014). Combines this with learning a language and it further complicates the matter of discussion for an ESL student.

For further studies, it is necessary to validate the results of this study to determine the generalizability of the model. It would also be beneficial to use the scale developed in other studies to see how classroom discussion predicts, mediates, or moderates other variables in various research designs. This could provide useful insights into research in various aspects of education. Lastly, research that explores differences among groups in how they see discussion could be useful for cultural studies. For

example, this may include exploring difference between eastern and western cultures.

The results of this study have limitations. The sample was derived from high school students. This means that the results may be of relevance to respondents from the same population. Furthermore, this study relied on personal opinions and there was an assumption that the respondents answered truthfully the statements on the survey.

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