

## **Informal cooperative learning in small groups: The effect of scaffolding on participation**

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This study examines the effect of group work scaffolding on participation. The procedural scaffolding of two cooperative learning techniques, Numbered Heads Together and Think-Pair-Share, are compared based on levels of participation, learning, and satisfaction they elicit. Aspects of participation that are examined include levels of group participation, more equality of participation among group members, and participation per turn taken by group members. In regards to participation, the results of this study appear to favour the technique with more procedural scaffolding in two of the three dependent variables, as Think-Pair-Share produced greater equality of participation and greater participation levels of group members per turn taken. No significant difference was found between the two techniques in regard to total participation. Furthermore, student perceptions favoured group work over instructional methods and Think-Pair-Share over Numbered Heads Together in terms of learning and satisfaction. This research shows that more developed and structured group tasks improve the overall learning experience of group work.

### **Introduction**

Cooperative learning (CL) involves group members making individual contributions in order to maximise learning and achieve a common goal for the group (Johnson, Johnson & Smith, 2014). Within the CL context, an individual group member's success is contingent on the success of the group as a whole, and is carried out through individual responsibility, positive interdependence, and individual contribution (Bolukbas, Keskin & Polat 2011; Johnson, et al., 2014; Korkmaz, 2012; Huang, Hsiao, Chang & Hu, 2012). In order for students to practice group cohesion, teachers need to create a learner-centred environment where students feel comfortable interacting with other group members without any perceived threats associated with the interaction (Ning, 2011). Connected with these ideas, Johnson and Johnson (1994) have claimed the following are key of CL: positive interdependence, face-to-face promotive interaction, individual accountability, social skills, and group processing.

Important objectives of any educational experience include the enhancement of student participation, learning, and satisfaction. CL consists of group work that, when properly structured by an instructor, encourages deeper learning, interdependence and individual accountability (Ali, 2011; Johnson, et al., 2014). Past literature on the use of CL has focused on the importance of participation in groups, which can be useful for learning, acquiring knowledge and information retention (Janssen, 2007; Johnson, Johnson & Smith, 2014; Tran, 2012). These outcomes are specifically desirable for English students in higher education, as studies have shown the advantage of using group work to enhance

learning in that area. In a class where the main objective is to gain proficiency in a second language such as English, CL allows students to make use of the target language to enhance their speaking ability, and also to enhance interaction among group members. This helps learners to make sense of the learning situation (Gömleksiz, 2007; Tsay & Brady, 2012). Furthermore, Bolukbas, et al. (2011) state that using CL for English language students makes their language use more meaningful and increases acquisition. Recently, there has been an increasing demand for use of CL group work within university classes, highlighting its importance in research involving students in higher education (Herrmann, 2013; Johnson, et al., 2014).

Participation among group members has been linked to an increase in learning and satisfaction (Zhu, 2012). Various ways of looking at participation within group work have been discussed in past research. They involve total participation of the group as a whole, greater equality of participation among the group members, and the amount of participation that occurs each time a group member speaks, all of which have been shown to affect the learning process (Core, Moore, & Zinn, 2003; Webb, 1995; Warschauer, 1995; Zhu, 2012). For the purposes of this paper, total participation refers to the total word production of the group and greater equality refers to how evenly distributed the students' word production is. Turn-taking refers to the amount of words used each time a group member speaks.

Ways of measuring the effectiveness of learning include perceived learning and student satisfaction (Huang, et al., 2012). There has been a shift within research to look at learning through the measurement of students' self-reported levels of learning instead of grades because outcomes such as grades are not true representations of learning within a specific course, as students' prior knowledge contribute to the grades they receive (Rovai & Barnum, 2007). Perceived learning is defined as the recognition by students that they have achieved understanding and acquired new knowledge of specific content (Casbi & Blau, 2008). Perceived learning has also been linked to student satisfaction of the learning experience (Richardson & Swan, 2003).

One possible way of promoting these outcomes is through the scaffolding process that occurs within the implementation of specific CL techniques. For the purposes of this study, the two techniques that are examined are Numbered Heads Together (NH) and Think-Pair-Share (TPS). Within each of these techniques, scaffolding is represented by specific procedural steps designed to provide support to group members leading up to group discussion, at which point the support is removed so students can construct their own knowledge (Kordaki & Sempos, 2009). It is worth examining whether the additional procedural scaffolding within TPS affects student participation. It will be useful for designing instruction that will further enhance desired learning outcomes in CL group work.

## **Theoretical background**

### **CL group work scaffolding**

Johnson, Johnson, and Smith (1998) have discussed different types of CL group work and how it can be divided into differing structural categories that include formal CL and informal CL. Formal CL involves group work that generally takes place over several sessions of a class, while informal CL involves the creation of small, ad-hoc groups so students can work together for shorter periods of time, usually one lesson (Johnson et al, 2014; Smith, Douglas & Cox, 2009). A variety of techniques comprise informal CL group work, including NH and TPS, which contain levels of scaffolding to support the students in their construction of knowledge (Karge, Phillips, Jessee, & McCabe, 2011).

Scaffolding can be viewed as an instructional method where teachers provide temporary guidance or support when introducing new content or explaining assignments through procedural steps (Cooper & Robinson, 2014). Based on the ideas of Vygotsky (1978), scaffolding operates on the premise that the support of the teacher leads the students to become independent learners, once that support is removed. Support can also be provided through what is known as procedural guideline scaffolding that helps with complex and unfamiliar tasks (Johnston & Cooper, 1999). Procedural guideline scaffolding is provided by breaking tasks down into individual and sequential steps so students get to a point where they can take over the task without any further support from the instructor. This type of scaffolding is evident in both NH and TPS.

NH was created to promote individual accountability and positive interdependence in order to ensure greater participation among students (Kagan, 1989). The goals of NH include involving the entire class in discussion, increasing group teaching through coaching among group members, increasing group morale and satisfaction, and providing all group members sufficient support to accomplish the task (Kordaki & Siempos, 2009). The procedural guideline scaffolds in NH include the instructor presenting students with a question, students being put into groups so they can discuss the question and produce a final answer as a group, and having one student explain the group's answer (Kagan, 1989).

TPS was created to promote active student involvement in their lessons (Lyman, 1981). Goals of TPS include increasing the quality of student responses, actively involving the students in the thinking process when preparing for discussion, and promoting retention of critical information (Kordaki & Siempos, 2009). Advantages of TPS include increasing motivation and engagement of students through personal interaction, as well as the participation of students who are generally reluctant to do so (Kordaki & Sempos, 2009). The procedural guideline scaffolding of TPS includes the instructor giving the students a question to discuss, students individually thinking about how they will answer the question, students taking notes based on their thoughts, students exchanging ideas with other members in their group, students noting the similarities and differences between group members' ideas, students creating a final answer that incorporates the best ideas of the group, and the group presenting their ideas to the class (Lyman, 1981; Johnson, Johnson, & Smith, 1991).

The present study examines the use of scaffolding with both the TPS and NH techniques. CL group work involving NH and TPS are heavily focused on structural scaffolding as opposed to content, which the students provide in their discussions, once the scaffold is removed (Kordaki & Siempos, 2009). Scaffolding is provided with NH through group discussion and coaching, holding them accountable for their share of the work once the scaffold is removed and one member must present the ideas to the class (Kordaki and Siempos, 2009). Scaffolding helps to enhance the discussion phase of TPS through the initial procedural scaffold by allowing the students to feel confident in sharing their ideas with their group members (Fisher, Brozo, Frey, & Ivey, 2007). A description of the scaffolding used in this study can be seen in Table 1.

Table 1: Procedural scaffolding of the techniques

Technique	Procedural structure
NH	Step 1: The group is given a question to discuss Step 2: The group discusses question and produces a final answer Step 3: A group representative explains the answer to the entire class
TPS	Step 1: Students are given a question to discuss Step 2: Students individually think about how to answer the question Step 3: Students take notes based on their thoughts Step 4: Students get into groups and share their ideas Step 5: Similarities and differences are noted between group members Step 6: A final answer is created incorporating the group's best ideas Step 7: A group representative explains the answer to the entire class

### Participation in groups

The roots of the theoretical benefits of participation are evident in the ideas of Dewey and Vygotsky. Dewey (1916) claimed that knowledge can be tied to participation through experiences and that participation in itself is a form of knowledge. He also claimed that participation becomes evident when experience is shared through the process of communication with others. Vygotsky (1978) believed that participation plays a significant role in socialising the learner. He promoted guided participation, where children could learn through participation with adults or those who were more experienced (Vygotsky, 1978). Knowledge, therefore, can be socially constructed by the learner through participatory interaction with others.

The ideas of Dewey and Vygotsky lay down the theoretical foundation for today's understanding of the importance of participation within group work. Generally, group work participation is defined as the active communication and student cooperation that is taking place during structured tasks (Bouton & Garth, 1983; Smith & Macgregor, 1992). Empirical evidence suggests that participation in groups actually aids the learning process, as research has shown that greater learning takes place when more words are being spoken by group members (Core, et al., 2003). Additionally, within informal CL group

work, it has been shown that student achievement levels increase the more actively they participate (Tsay & Brady, 2010).

Participation equality in group work is important because it means every member has an equal opportunity to contribute to the process and construct their own knowledge (Johnson & Johnson, 1994; Webb, 1995). One problem with a lack of equality of participation is the idea that when students are not participating equally, a greater chance exists of “social loafing”, where one or more students rely on the rest of the group to carry them. These students who don’t participate are often called “free riders” who contribute little or nothing to the group (Johnson & Johnson, 1994; Onwuegbuzie, Collins, and Jiao, 2009). Also, when some group members are participating at a disproportionately greater rate, this can keep the other group members from having a fair chance at participating, preventing them from engaging with the learning contents fully (Kagen, 1994).

Participation through turn-taking is evident, as student utterances are produced through successive steps that are represented as turns (McKinlay, Procter, Masting, Woodburn & Arnott, 1993). McKinlay, et.al, (1993) discuss how each turn taken by one student is affected by what a different student says in a previous turn. Empirical research involving the amount of words used per turn has occurred within blended learning, showing more words per turn being used online, promoting the use of online interaction to support further participation in subsequent face-to-face discussions (Warschauer, 1995). However, a lack of sufficient research exists that examines turn-taking within informal cooperative learning group work.

### **Effects of scaffolding on participation**

Linking participation with scaffolding has been the focus of research in the past. Specifically, scaffolding involving university students within a second language learning context has received attention. Scaffolding is particularly useful in this context, as it helps those who find it difficult to verbally express themselves in the target language (Heinonen & Lennartson-Hokkanen, 2015). Within this context, Heinonen and Lenn-Hokkanen (2015) sought to increase participation by developing scaffolding strategies based on Donato’s (2010) definition of scaffolding, which states that teachers scaffold the learning experience by shaping the discussion to achieve goals of specific tasks and to activate the background knowledge of students. Furthermore, using open-ended and follow-up questions can lead to more “substantial and elaborate” answers from the students (Heinonen & Lennartson-Hokkanen, 2015).

Scaffolding for the purposes of increasing participation has also been used in a mobile learning context. In an effort to help students reach their learning target through scaffolded stages, Abdullah, Hussin and Zakaria (2013) modified Salmon’s (2000) five-stage scaffolding model for use among university language learners to guide them through technical support as a means to increase participation and promote group discussions. Based on Vygotsky’s (1978) zone of proximal development, the model was used as supportive scaffolding designed to aid students in learning beyond what their abilities

would allow them to do on their own in order to reach a higher level of knowledge. Results of the study supported the use of scaffolding to increase participation, as higher levels of participation were found among the students as they progressed through the scaffolding stages.

### **CL group work compared to other instructional methods**

Although scaffolding of CL group work may lead to a positive experience in terms of participation, it is worth investigating whether CL is more effective than other instructional methods in terms of other learning outcomes. CL group work has been shown to have advantages over other instructional methods, specifically when it comes to promoting learning and satisfaction. Carlsmith and Cooper (2002) claim that CL group work is more effective than traditional forms of instruction because students work harder and learn more. Johnson et al. (2014) performed a meta-analysis of more than 168 studies involving university students, showing that CL group work is more effective in promoting higher achievement than individual or competitive learning, with achievement being equated with knowledge acquisition, retention, accuracy, and higher level reasoning. Academic achievement has also been found to benefit from CL group work within online environments as well, highlighting the importance of promoting such group work regardless of the environment (Bolukbas, et al., 2011). Increasing other aspects of learning such as student retention has been the focus of past research, and studies have shown that informal CL group work is effective in this area when compared to lecture-based teaching (Tran, 2012). Informal CL group work is ideal for promoting student learning, as Carss (2007) claims it promotes critical thinking and knowledge construction by combining cognitive and social aspects of the learning process. In terms of satisfaction, social support provided through CL group work helps in the development of positive relationships among group members and leads to higher levels of satisfaction (Slavin, 2011; Woods & Chen, 2011).

Research has shown that CL group work increases levels of learning and satisfaction. For this reason there is value in understanding if scaffolding affects learning and satisfaction in informal group work settings. The TPS-technique develops comprehension and metacognitive awareness and is promotes meaningful interaction through the scaffolding process (Carss, 2007). Providing empirical evidence of such meaningful interaction, Casem (2013) showed that when TPS was used as scaffolding, there was greater retention among research participants. In terms of satisfaction, scaffolding that takes place within online environments has been shown to result in higher levels of satisfaction among learners (Zheng, Cao, Das & Yin, 2014).

### **The current study**

This study attempts to gain much needed empirical evidence to show a link between procedural scaffolding and participation. One problem with extant research is that there is a lack of focus on scaffolding of informal CL techniques in order to promote interaction, specifically participation. The goal of this study is to find out if higher levels of procedural scaffolding lead to elevated levels of participation. In order to differentiate levels of

procedural scaffolding, two informal CL techniques are used: a low-scaffolded NH technique and a high-scaffolded TPS technique. This study compares the following between various techniques: the amount of participation of the group as a whole, the equality of participation among members, and the amount of student participation per turn taken. Additionally, student perceptions are examined in terms of satisfaction and learning when comparing group work to other instructional methods. This study also examines student perceptions of learning and satisfaction when comparing the TPS and the NH techniques.

The pilot study of the current experiment examined participation output based on procedural structure of informal CL techniques (Lange & Costley, 2014). Specifically, TPS was compared with NH and Jigsaw techniques. The results showed a difference of words per turn used favouring the TPS technique, but the differences of the other two dependent variables were not significant ( $p > .05$ ). A limitation of the pilot study is that there were a limited number of treatments given and there was no consistency in the group makeup. The current study however, should prove to be more reliable because more treatments were involved and the same groups consisting of the same members were used throughout the six week experiment.

### **Research questions**

- Q1: Does the amount of procedural scaffolding affect the level of participation within group work?
- Q2: Does the amount of procedural scaffolding affect the equality of participation within group work?
- Q3: Does the amount of procedural scaffolding affect the level of student participation per turn taken within group work?
- Q4: Do students prefer informal cooperative learning group work compared to other instructional methods?
- Q5: Do students prefer informal cooperative learning group work containing higher procedural scaffolding?

### **Methods**

#### **Settings and participants**

The participants of this study were undergraduate students at a South Korean national university. The participants participated in a 16 week English conversation class in the English Education Department. 16 participants were divided into four main groups of four. Of those 16 participants, there were 13 females and 3 males, who ranged from 21 to 25 years old. The purpose of the class was to improve the learner's ability to deal with the interview and teaching demonstration sections of the Korean teacher's entrance exam (Im-yong-gyo-shi). The students from this major must prepare for this test in a variety of ways, as it tests not only educational knowledge, but also the student's knowledge of linguistics, English grammar, English literature, and the Korean education system.

The title of the class was *English for Teaching Purposes*, and had as its stated goal from the syllabus: "Students will be able to deliver a well-structured lesson in English. Also, students must be able to answer test questions from the previous year's teacher's entrance exam interview." The class was run for a full semester (16 weeks), and each class was one single 3 hour chunk of time. The course consisted of three graded components, which were a final interview, an online writing section, and an in-class participation grade. A range of activities, including group work, reflected the in-class participation grade. Dialogue creation and group work made up the in-class activities.

The group work activities that were done as part of this class were designed to get students thinking and talking about issues relating to education. Students from this major often struggle coming up with creative and nuanced answers to questions about education in general and English education specifically. So the group work was based around questions that would be broader than they might be expected to deal with in an interview in the hope that it will engage and develop ideas the students might be able to use in other contexts. All of the students were fairly experienced with this type of group work prior to this conversation class, with a majority of them having specific experience with informal cooperative learning group work.

### **Procedure and data collection**

As part of their normal in-class group work, the participants in this study were randomly divided into 4 groups of 4 people each. In March and April of 2014, the groups did six weeks of group work using the same members for each week. Every week, each group was given a question pertaining to English education. They were then asked to produce a final answer agreed upon by all the members of their group. There were 6 different questions asked to the groups during the experiment (one question per week) with each group getting the same weekly question. The questions were designed for students to develop their English conversational abilities through critical analysis of issues pertaining to English education. Examples of discussion topics are effective ways teachers can capture the attention of their students, important qualities of teachers and students, and ways of improving the Korean education system (see Appendix 1). Reflective of an English conversation class, all of the questions used for the group work were presented in English. Additionally, English was used by the participants in the group work discussions and the students were told not to speak Korean during their discussions.

Two varying informal cooperative learning techniques were used for the group work in order to see if the participation outcomes were connected to the specific technique that was used. The techniques that were used were NH and TPS. During the six week process, these techniques were spread out among 4 groups, creating 24 treatments. The techniques were evenly distributed with 12 treatments used for TPS and 12 treatments used for NH.

The instructor explained the tasks to the students, who were then told to attempt the activity. There was limited interaction with the instructor and the participants once the tasks had begun. The participants' voices were recorded during the tasks and the audio was transcribed for analysis. The techniques used in this study vary in regards to their

levels of procedural scaffolding. Within NH, students were given the question, discussed the question, and produced a final group answer based on the discussion. One member of the group was selected as a representative to explain the group's final answer to the entire class. With TPS, students were given the same question as the NH group, and told to individually think about how they would answer the question. Furthermore, they took notes based on their reflection and had their own prepared answers before joining their group. They then got into their groups and shared their ideas with other group members. During the discussion, the group members noted similarities and differences between their ideas and created a final group answer that incorporated what the group agreed on as being the best ideas. A group representative was then selected to explain the final answer to the entire class. The techniques used served as the independent variables and participation in the techniques served as the dependent variable. Data was gathered through an analysis of transcribed audio-recorded interactions between group members.

To avoid confusion in identifying student voices on the recording, the following steps were taken: Each group was initially assigned a number and the audio recordings were saved and labelled according to the group that participated in the recorded task. It was made clear in notes kept by the researchers which members belonged to which groups, as not to create confusion about who the 4 participants were in each group recording. Throughout the recording, students referenced each other by names, allowing the researcher to initially match the voice with the person speaking. Once an initial match was made, notes were taken by the researcher describing each member's voice (ex: male, female, high-pitched, low, husky, soft-spoken, nasally, etc.), which allowed the researcher to identify who was saying what, while transcribing the discussion. Each recording was listened to multiple times to make sure the researcher was accurately distinguishing between the voices of the group members, particularly those with similar voices. After listening to the recordings of specific groups numerous times, the researcher became familiar with the distinctions between voices and gained the ability to match the voice with the participant without needing to reference the noted description of the voice. Because the students were warned not to speak Korean during the task, there were very few instances of Korean being used during the discussion. When it did occur, it usually consisted of one group member asking other group members how to say a specific word in English. Additionally, there were a few instances where Korean between participants was used right after the teacher explained the task to clarify the instructions before discussion. In these cases, the Korean was not transcribed for analysis.

After the experiment was completed, students who participated in the study were contacted and asked to answer questions about the group work they participated in, and their perceptions of the TPS and NH techniques. The students were first reminded of the class in general, and then there was a short discussion where the students were reminded of the questions they have been asked, and the differences between the two group work techniques they had participated in. After this, the students were given six 5-point Likert items to respond to. Their responses to those items are used to understand the student perceptions of their group work activities.

## Data analysis

All participation measures were derived from the 24 transcriptions (4 groups per week by 6 weeks of the experiment). There was one main measure used to assess the participation rates in this study, which was word count. Word count was used in several different ways to assess participation.

- 1) Comparing the total words of each group per technique used. This was done by simply producing a word count from the document used for the transcriptions. The word count from the document was produced by adding up each word from the transcripts. This produced a total word count for the group, which was used for analysis. The formula used is  $(X1 + X2 + X3 + \dots + XN)$ .
- 2) Comparing the equality of participation per technique used. This was done by using the variance percentage of each group. To obtain each group's variance percentage, the following steps were taken with each treatment. The group's average amount of words used ( $\bar{x}$ ) was subtracted from each individual student's amount of total words used ( $x_i$ ). That number was then squared to get each student's deviation from the median,  $(x_i - \bar{x})^2$ . The deviation of each student was then added to get a sum ( $\Sigma$ ). The sum of the deviations was then divided by the number of students minus 1 ( $n-1$ ). This produced the final variance percentage of the group ( $s^2$ ), which was used for analysis. The variance represents the distance from the average, which shows how equal the participation is among group members. The lower the number, the more equal the participation is. The variance formula used is  $s^2 = \Sigma [(x_i - \bar{x})^2] / n-1$ .
- 3) Comparing each group's average number of words used in each turn per technique used. This was done by adding the total number of the group's words and dividing it by the total number of uninterrupted turns used by the group. This produced the group's average number of words used in each turn, which was used for analysis. The arithmetic mean formula used is  $(X1 + X2 + X3 + \dots + XN) / N$ .

Table 2 outlines the measures by showing the independent variables used in order to get an outcome from dependent variables, which are also listed in the table.

All the measures regarding student preference were derived from the 16 participant responses to survey items using a 5 point Likert-item scale (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree). The 6 items used for analysis focused on how satisfied the students were with the group work compared to other parts of the lesson, how much they learned with group work compared to other parts of the lesson, how much they prefer when everyone participates equally, how much they prefer TPS to NH, how satisfied they were with TPS compared to NH, and how much they learned from TPS compared to NH. Analysis was based on the frequency of participant responses along the Likert scale.

Table 2: Variables

Ind. variable	Dep. variable 1	Dep. variable 2	Dep. variable 3
TPS	Participation equality	Average words per turn	Total words
NH	Participation equality	Average words per turn	Total words

## Results

### Effects of procedural scaffolding on levels of participation

The total number of words of the group was calculated by adding together the total number of words made by each group in all the treatments. A total of 12 treatments were done using TPS and a total of 12 treatments were done using NH. Then, a comparison of total number of words per group between NH and TPS was made. When looking at Table 3, it is apparent that there is no clear difference between the techniques used, as the means are very similar. T-testing also showed that there was no statistical difference of total words based on technique type ( $p > .5$ ). This demonstrates that the techniques which vary by procedural scaffolding do not significantly vary based on total word count measures.

Table 3: T-test: Total words per technique used

Technique	N	Mean	SD	T	P
TPS	12	951.08	241.546	.274	.786
NH	12	979.08	258.092		

### Effects of procedural scaffolding on equality of participation

The second analysis of the study focused on the equality of participation between group members. This was determined by calculating the variance percentage. Participation is considered to be more equal the lower the number is. The variance percentage of the TPS groups was calculated by averaging the variance percentages of all 12 of the groups. The same was done for the NH groups. When comparing the TPS groups with the NH groups, the groups that used the TPS technique have a lower variance percentage than the groups that used the NH technique. T-tests also found a significant statistical difference ( $p = .016$ ). The results in table 4 show that the groups that used the TPS technique were more equal to each other in terms of participation than the groups that used the NH technique, based on having a lower mean variance.

Table 4: T-test: Equality of participation based on technique

Technique	N	Mean	SD	T	P
TPS	12	15280.75	11374.926	2.656	.016
NH	12	31862.25	18397.095		

### Effects of procedural structure on participation per turn

The next focus of this study was the assessment of the average words per turn taken by the groups. This was calculated by adding up the words per turn taken by each member in the group and dividing that by the number of turns taken by the group. Then, a comparison was made between the average words per turn between the TPS groups and the average number of words per turn taken by the NH groups. When the TPS groups are compared with the NH groups, it appears that the TPS groups have a higher average word per turn count (Table 5). T-testing showed that the difference between the TPS and NH groups was statistically significant ( $p = .015$ ).

Table 5: T-test: Participation per turn

Technique	N	Mean	SD	T	P
TPS	12	16.92	7.763	2.656	.015
NH	12	10.17	4.366		

### Student perceptions of informal CL group work

To measure the students' perceptions of group work, 5-point Likert scales were used. Overall students were generally satisfied. Of the 16 participants 11 were more satisfied with group work than other in-class activities, and the remaining 5 were neutral. The results were similar for learning, where 10 of the 16 students felt they learned more from CL group work than with other instructional methods. Of those 10, 5 agreed and 5 strongly agreed with the learning item. The remaining 6 participants were neutral in regards to the learning item, and no participants disagreed or strongly disagreed.

Student perceptions of NH and TPS were examined to see if students felt they learned more with TPS, preferred TPS to NH, and were more satisfied with TPS. Referencing the learning item, 11 of the 16 students felt as if they learned more from TPS than NH (6 agree and 5 strongly agree). 5 of the participants were neutral and none of them disagreed or strongly disagreed. In regards to preference, the participants generally showed that they prefer TPS, with 12 of the 16 agreeing with the preference item (6 agree and 6 strongly agree). 2 participants were neutral in regards to the item and 2 disagreed with the item. None of the participants strongly disagreed with the statement. In regards to the satisfaction item, 9 of the 16 participants responded that they felt more satisfied with TPS (5 agree and 4 strongly agree). 5 of the students were neutral in regards to the item and 2 disagreed.

The results of the previous analysis may indicate that because students prefer the TPS technique, they may also prefer equality of participation, which has been shown in this study to be an outcome of TPS. Because of this reason, the final analysis looked at how students viewed equality of participation. 11 of the 16 participants agreed that they prefer when everyone participates equally. 6 of those 11 agreed and 5 strongly agreed. 5 of the

students were neutral in regards to the item and no participants disagreed or strongly disagreed. The results regarding student perception are shown in Table 6.

Table 6: Likert-scale perception frequency

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
More satisfied with group work than other parts of lesson	0	0	5	5	6
Learned more from group work than other parts of lesson	0	0	6	5	5
Prefer TPS to NH	0	2	2	6	6
More satisfied with TPS than NH	0	2	5	5	4
Learned more with TPS than NH	0	0	5	6	5
Prefer when everyone participates equally	0	0	5	6	5

## Discussion

Acknowledging the importance of participation within a higher education second language setting, it is important to explore ways in which participation levels can be increased, as well as ways of promoting greater equality of participation within group work. Scaffolding group work may be a way in which participation can be promoted, as well as a way of creating a better overall learning environment for the students. The results of this study are useful for instructors, as they showed that scaffolding of informal cooperative learning group work had an effect of participation as well as student perceptions of the learning environment.

Based on the results, there appeared to be no difference between techniques in regards to total word production in groups. While using TPS, greater participation can possibly be accounted for because group members use the time afforded to them in order to prepare their answers, which would give them more information to contribute to the work of the group (Lyman, 1981). But the results of this study show no significant difference favouring the TPS over NH in this regard. Because the NH students did not have time to think about their answers beforehand, it is possible that there was more of a need to construct their answers with each other during the group work, which may have produced similar total-participation levels as the TPS technique.

The results showed that TPS contained more equal participation among group members than NH. Equality of participation is important, and instructors need to find ways to structure group work that can produce equal levels of participation (Johnson & Johnson, 1994; Webb, 1995; Onwuegbuzie, et al., 2009). Because TPS contains more procedural scaffolding than NH, the students may have become more actively involved while using TPS due to the additional steps taken. Thinking about answers beforehand allows students to become more active in the group work and produce more detailed answers (Rowe, 1986). The additional steps could help produce a more equal outcome in terms of participation because each student obtained more detailed, shareable information based

on thinking about their answers prior to discussion. Students, who may have otherwise contributed a minimal amount of information, had more detailed information to contribute based on being able to think beforehand. Their contributions to the group could have levelled out the participation, as those who typically would dominate the conversation had to share more participation time with other members who had more to contribute due to prior preparation.

Results also showed that TPS favoured NH in regards to the amount of words spoken per turn. Rowe (1986) explains that giving time to students to think about their answers beforehand provides longer answers to questions posed by the instructor. Therefore, students who are prepared to discuss a topic after reflection and note taking can contribute more detailed answers through longer sequences of words. Mckinlay, et al. (1993) emphasise the fact that a turn taken by a particular student is affected by what was said in the previous turn taken by another student. Therefore, more information being presented at a single time potentially has greater effects on what will be said in the following turn by another student, further promoting more participation. This can also lead to a greater construction of knowledge by the students, as a greater amount of words per turn produces more information for each student to respond to each time.

The results of student perception in this study are quite telling when it comes to the learning experiences obtained through group work. The fact that the participants generally favoured the CL group work over other instructional methods in the class is supported by past research (Bolukbas, 2011; Huang, et al., 2014; Johnson, et al., 2014; Karkmaz, 2012; Tran, 2012). Reflecting the context of this study, keeping students actively engaged has been shown to be an effective approach within L2 university classrooms, as it allows students to make better use of the target language (Gömleksiz, 2007; Tsay & Brady, 2012). This may have led to the participants having a preference for CL group work, as its usage has been found to be particularly effective in an L2 setting. Additionally, the participants in this study generally perceived higher levels of learning and satisfaction when using TPS, which contained more procedural scaffolding compared to NH. This makes sense in light of research showing that scaffolding has led to higher levels of learning and satisfaction among group work participants (Zheng, et al., 2014). Scaffolding within CL group work has been tied to greater retention, creating a more meaningful experience for students (Carss, 2007; Casem, 2013). Knowing that promoting learning and creating a better learning environment has been tied to higher levels of satisfaction (Richardson & Swan, 2003), it is not surprising that students were more satisfied with TPS, due to its reputation of promoting learning through highly structured procedural scaffolding. Furthermore, the fact that TPS was more effective in promoting greater equality of participation may have contributed to the participants being more satisfied with the technique, as they also showed that they prefer group work that promotes equal participation.

Reflecting on the theoretical roots of participation, deeper pedagogical implications can be made in regards to the results of this experiment. One way in which knowledge is constructed within group work is through group members being actively involved in the learning process (Johnson, et al., 2014). The additional procedural scaffolding within TPS greatly reduces the chance that a group member will passively observe other members.

Thinking and taking notes beforehand in itself contributes to active involvement. In addition, it provides group members with self-organised, sharable information, which reduces the chance of passively observing during the group discussion. It is possible that this contributed to the results of this study that favoured TPS over NH in terms of participation equality and number of words produced per turn.

Referring to thinking as inner speech or internalisation, Vygotsky (1978) explained that it occurs as a learner regulates his or her activity through thoughts. He described the process of practical activity being constructed into meaning through internalisation, which in turn is connected by speech to the external world of the child. When one analyses the procedural scaffolding of the TPS technique, the ideas of Vygotsky become relevant and help explain how this particular technique is conducive for the construction of knowledge. The additional steps in the TPS technique reflect the learner's discourse, as the students are left to think about their answers individually. Their thoughts are then connected to the "external world", in this case to the other members of the group, in order to construct further meaning through participation. Kozulin (1999) details Vygotsky's ideas on inner speech, explaining that "inner speech" can be used not only for reviewing past events, but for preparing for future conversations as well. Holding to the belief that inner speech can prepare a learner for future conversations provides further insight to TPS and how it allows for thought to play a key role in the construction of knowledge. Having the students think about their answers individually beforehand represents a way of preparing future contributions to the work of the group, allowing for more construction of knowledge through participation within the group work, and further leading to a more satisfying learning experience.

## **Conclusion and limitations**

Unlike previous research on group work, this study connects participation with procedural scaffolding of informal cooperative learning techniques. The results show informal CL group work used in an English Education university course produced more equal participation and more words spoken in sequences when a technique containing more procedural scaffolding was used. It is apparent, based on the theoretical framework of participation, that the additional procedural steps used in the TPS technique are more beneficial to the construction of knowledge by the learner than if the NH technique is used. This proves to be valuable for instructors who wish to enhance the learning process, particularly in a second language, higher education setting. Its value is evident in the fact that the students perceived both CL group work in general and TPS specifically as being beneficial to learning and satisfaction.

Although many important pedagogical implications can be made through the results of this study, there are some limitations. Acknowledging that the course used in this study contained an online element and that online learning often compliments face-to-face instruction, it would be useful to examine the relationship between the two settings, and its effect on outcomes examined in this study. Also, this study focuses strictly on participation through word production. Although word production is important, it can be

argued that the actual ideas that students contribute to the group are equally as important. Critical thinking responses through participation, for example, appear to enhance the construction of knowledge by the students. Acknowledging that what is actually being said by students when they participate is also important, suggestions for further research include ways in which to promote more useful forms of participation in group work through structure. Further analyses of the group work transcripts in regards to the quality and nature of the discourse and its relationship with participation is a fruitful area for further research.

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## **Appendix 1: Questions given for the group work**

1. Topic: What are the four most effective ways in which teachers can gain the attention of their students? Among the four ways chosen by the group, rank them from most effective to least effective. Come up with a final, agreed upon, group ranking.
2. Topic: Which aspects of university life have negative effects on studying and grades? Among those four effects, rank them from most impactful to least impactful in terms of effecting studying and grades. Come up with a final, agreed upon answer.
3. Topic: What are the four most important student qualities? Among the four qualities chosen by the group, rank them from most important to least important. Come up with a final, agreed upon, group ranking.
4. Topic: What are the four most important teacher qualities? Among the four qualities chosen by the group, rank them from most important to least important. Come up with a final, agreed upon, group ranking.
5. Topic: What are the four most important aspects of a good university? Among the four aspects chosen by the group, rank them from most important to least important. Come up with a final, agreed upon, group ranking.

6. Topic: What are the four most important aspects of the Korean English education system? Among the four aspects chosen by the group, rank them from most important to least important. Come up with a final, agreed upon, group ranking.

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