



## **THE EFFECTS OF THINK-ALOUD IN A COLLABORATIVE ENVIRONMENT TO IMPROVE COMPREHENSION OF L2 TEXTS**

**Goh Hock Seng**

Universiti Pendidikan Sultan Idris, Malaysia

[goh@upsi.edu.my](mailto:goh@upsi.edu.my)

### **Abstract**

---

Numerous studies have shown that thinking aloud while reading can be an effective instructional technique in helping students improve their reading comprehension. However, most of the studies that examined the effects of think-aloud involve subjects reading individually and carried out in isolation away from the classroom context. Recently, researchers have begun to explore efforts to engage students in constructing meaning from text through collaborative discussions. Hence, framed within Vygotsky's socio-cognitive theories, this study is an attempt to examine the effects of combining think-aloud and collaboration in the classroom context in enhancing reading comprehension among English as Second Language (ESL) students at tertiary level in Malaysia. A quasi-experimental design using two intact classes of ESL students was used in examining the effects. The findings, pedagogical implications and limitations of the study will also be discussed.

---

### **Introduction**

This article reports a study which examined the effects of combining think-aloud and collaborative discussion with the primary aim of improving reading comprehension. The usefulness of think-aloud is currently being explored in efforts to engage students in constructing meaning from text through collaborative discussions (Kucan and Beck, 1997). Such efforts indicate a new direction for the use of think-aloud, one in which "social interaction assumes increased importance" (ibid., p. 271).

Hence, the purpose of the study was to examine the effects of think-aloud in a collaborative situation on ESL students' ability to comprehend L2 reading passages. A related purpose was to investigate what happens during the group think-aloud sessions. While the first purpose mentioned pertained to the product or outcome of the instructional procedure, the second purpose was concerned with the processes that occur with the use of the procedure. Such a two-pronged approach to the study provided a more comprehensive view of the instructional procedure's efficacy. However, this article will only report the part of the study which examined the effects of the instructional procedure through the use of a quasi-experiment.

### **Background And Literature Review**

#### **Think-aloud and Collaboration in Reading Instruction**

Think-aloud is described as a “stream-of-consciousness disclosure of thought processes” (Cohen, 1996, p.7). In the past three decades, the think-aloud procedure has increased in popularity among researchers as a data collection instrument in areas of research that espouse a cognitive perspective such as problem solving and second language learning (Ericsson and Simon, 1987; Ericsson and Simon, 1993; Faerch and Kasper, 1987). Extensive use of the said procedure in collecting ‘verbal protocols’ (Afflerbach, 2000; Cohen, 1996; Cohen and Hosenfeld, 1981; Newell and Simon, 1972; Pressley and Afflerbach, 1995) is due to its ability to provide researchers with a ‘window’ into hidden thought processes (Block, 1986; Crain-Thoreson, Lipmann and McClendon-Magnuson, 1997).

Such potential to reveal the thought processes, which is the power of think-aloud as a research method, is also an aspect of its potential as an instructional method (Kamhi-Stein, 1998; Kucan and Beck, 1997). The use of think-aloud as an instructional technique in reading comprehension evolved from research in observational learning and problem solving (Womack, 1991). As reading comprehension is also conceptualised as a problem solving activity (Elekes, 1997; Hosenfeld, 1984; Olshavsky, 1977) that involves covert thinking processes, the use of think-aloud in making the hidden processes observable is particularly appealing as a teaching technique as well as a learning technique.

Besides thinking aloud, collaboration is presently seen as playing crucial roles particularly in the area of reading comprehension instruction with many recent methods of strategy instruction emphasising collaboration as playing a pivotal role in the success of the methods. While most methods see collaboration as essentially teacher-led, the present study’s focus on peer collaboration provides further insight on this aspect of collaboration in reading instruction

Reading researchers seeking to encourage students to be actively engaged with the text they read have looked to collaborative discussion as a way to achieve that aim. As Beck, McKeown, Worthy, Sandora and Kucan (1996, p. 386) put it, “collaboration, in which students share and challenge each others’ ideas, is seen as the key to promoting students’ engagement”. Engagement during reading refers to sustained personal commitment to creating understanding while one reads (Almasi, McKeown, and Beck, 1996; Nystrand and Gamoran, 1991). It is inevitable that collaborative discussion requires socialised and overt speech to be used. In this regard, thinking aloud plays an important role as teachers and students participate in social context such as collaborative discussion in the reading classroom. To a certain extent, thinking aloud or making one’s thoughts public while sharing and even challenging each others’ ideas is vital in making any collaboration successful (Beck et al., 1996).

There are recent studies and instructional approaches in which think-aloud is seen as playing a facilitative role in social interaction. The importance of the social context in learning and cognitive development (Vygotsky, 1978) has received much attention among reading researchers (Gaffney and Anderson, 2000). The Vygotskian view of learning as inherently social and that knowledge is socially constructed has been used to provide the conceptual frame for various reading instruction models, most notably Collaborative Strategic Reading (Klingner, Vaughn, and Schumm, 1998), Collaborative Strategy Instruction (Anderson and Roit, 1993), Transactional Strategies Instruction (Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, Brown, 1992), and Reciprocal Teaching (Palincsar and Brown, 1984). These approaches encourage think-aloud or making one’s thoughts public, either implicitly or explicitly, as an important feature in collaborative discussions that are intended to engage students in constructing meaning from texts. Studies on those approaches incorporating the use of think-aloud and collaboration have also shown that they have been successful in helping students obtain gains in their reading

comprehension scores (Anderson and Roit, 1993; Klingner, et al., 1998; Palincsar and Brown, 1984; Pressley, et al., 1992).

These studies seem to provide evidence for the usefulness of think-aloud as an instructional teaching and learning strategy whether used on its own or in combination with collaboration. Besides that, the technique has been widely disseminated in reference books and reading instruction manuals as one of the suggested techniques in teaching reading (e.g. Arbersold and Field, 1997; McEwan, 2004; Richek, Caldwell, Jennings, and Lerner, 1996; Tierney and Readance, 2000).

However, these studies were carried out in L1 reading settings. Even though some of the empirical studies do involve multi-ethnic groups with some students speaking English as a second language, most of the students involved were native speakers of English in an L1 environment. Whether the use of think-aloud by ESL students, who may not be proficient in the target language, in an ESL setting will provide equally positive effects on reading comprehension remains largely uncharted.

Additionally, at the present time, there is no extensive body of research pertaining to the combined use of think-aloud and collaboration similar to the aforementioned reading instructional approaches in a second language (L2) setting. Although positive findings can be found in the limited literature, the small number of studies and lack of direct investigation on the effectiveness of approaches that utilise think-aloud and collaboration do not allow for the drawing of conclusions and clear instructional implications in the L2 reading classroom.

Thus, the aim of the study was to explore the use of think-aloud in a collaborative environment in helping ESL students improve their reading comprehension. Correspondingly, answers to the following question is sought:

Do the reading comprehension scores of the students in the experimental group, who received instruction in using think-aloud, differ significantly from the students in the comparison group who did not receive the instruction?

### **Theoretical Framework**

The theoretical underpinning for the present study can be found in Vygotsky's (1978, 1986) perspectives of learning which emphasise the central role of social interaction in the process of learning. Vygotsky (1978) claimed that "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in co-operation with his peers" (p.104). In other words, human learning is always mediated through others in that knowledge is social, constructed through collaborative efforts to learn, understand, and solve problems (Garrison, 1995; Glaser, 1991; Johnson and Johnson, 1999). The importance of social interaction on the cognitive development of a child can also be seen through Vygotsky's claim that:

Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. (Vygotsky, 1986, p. 163)

Such a claim implies a transition from the interpsychological or 'intermental' (Wertsch, 1991) functioning, i.e. between people, to the intrapsychological or 'intramental' functioning of the individual. Thus, what is learnt through social interaction at an intermental plane is internalised by the individual so that cognitive development takes place within the

individual at the intramental plane. In other words, involvement in joint activities with others may generate understanding which is then internalised as individual knowledge and capabilities (Afflerbach, 2000).

For Vygotsky, social interaction is the mechanism for individual development, since in the presence of a more capable participant, the novice is drawn into, and operates within, the space of the expert's strategic processes for problem solving (Donato, 1994). Hence, Vygotsky argued that what an individual can do now in collaborative interactions gradually becomes, in time, internalised and be part of the individual's independent capabilities (Brown, Metz, and Campione, 1996).

In Vygotskian perspective of education, the importance of social interaction is often associated with another theoretical notion proposed by Vygotsky, that is, the 'zone of proximal development' (ZPD). As far as Vygotsky (1986) is concerned, consideration of the child's ZPD is considered of focal importance for the study of learning and development. For instruction to be effective, Vygotsky stressed that two different levels of development need to be identified in a child. The first level is the actual developmental level as indicated by the problems that the child can solve independently. The second level is the potential level that the child can reach in solving problems with assistance. The discrepancy between these two levels is what Vygotsky called as the 'zone of proximal development' (Vygotsky, 1986, p. 187). In addition, according to Vygotsky (1978), the level of potential development of a child can be achieved "under adult guidance or in collaboration with more capable peers" (p. 86).

The ZPD is seen by researchers as providing a way of conceptualising the many ways in which an individual's development may be assisted by other members in the social context and how one can change intermental, and hence intramental functioning of a child (Wells, 2000; Wertsch and Tulviste, 1992). Such views point to organisation of instruction where social interaction can and should be structured to bring about desired changes in the individual. A good example of such instructional implication is reciprocal teaching (Palincsar and Brown, 1984, Palincsar, 1984) in the area of reading which is grounded on this Vygotskian concept of ZPD. Reciprocal teaching was designed to provoke zones of proximal development within which readers of varying abilities can find support during their quest to understand expository texts (Brown, Metz, and Campione, 1996).

The concept of ZPD and what the children can do with the help of an adult or in collaboration with their peers was very relevant to the instructional design of the present study, which was one reason why a framework based on Vygotskian perspective was considered appropriate. A crucial feature in the discussion of ZPD is the support or scaffold provided in the ZPD whereby the child or learner is guided towards his or her potential level of development. The metaphor of scaffolding has been used to characterise the forms of assistance provided by the adult or peers to help students bridge the gap between their current abilities and the intended level (Cazden, 1993). Researchers note that scaffolds are only useful within the student's ZPD where the student cannot proceed alone, but can proceed when scaffolding is provided (Rosenshine and Meister, 1998).

Although Vygotsky emphasised the importance of assistance in adult-child (expert-novice) interaction and peer interaction, the present study focused on the latter. Forman and Cazden (1991) observed that while very often in Vygotsky's writings, the social relationship referred to as "teaching" is the one-to-one relationship, when we try to explore Vygotskian perspectives for education, we "immediately confront questions about the role of the student peer group" (p.156). Vygotsky recognised the influence that peers can have on one another as they construct meaning in that peer interactions can "promote sustained achievement for less competent students and thereby produces cognitive growth" (Jaramillo, 1996, p.139). It follows that during group reading where think-aloud is encouraged, supportive conditions can

be created in which a weaker reader can participate in, and extend, current skills and knowledge to higher levels of competence (Donato, 1994).

In this study, the teacher played the role of the expert participant in guiding the students in problem solving during reading. Nonetheless, in a heterogeneous group with readers of varying reading comprehension abilities, the designation of expert and novice may switch among the students themselves depending on factors such as their experiences, familiarity with the topic, levels of proficiency, levels of confidence and so on. As an instructor commented in an adult literary program using collaborative practices, “If someone understands something and someone doesn’t, you have a natural teacher from one of the students. It changes from person to person, but they help each other” (Taylor, King, Pinsent-Johnson, and Lothian, 2003, p. 8). Thus, while acknowledging the important role played by the classroom teacher or the expert in providing support, the approach in the model of instruction in this study will focus on the ‘collective scaffolding’ (Donato, 1994) provided among peers. Donato’s (1994) study has shown that collaborative work among a group of mature second language learners provide their peers the same guided support as the one found in most noticeable forms of expert-novice interaction. Wells (2000) noted that in collaborative activities, participants contribute to the solution of problems according to their current ability to do so. At the same time, they provide support and assistance for each other. He also pointed out that it is not necessarily the most expert member(s) of the group who are most helpful during an activity but members with little expertise can learn with and from each other, as well as from those with greater experience.

Another reason a Vygotskian perspective is suitable for this study is the vital role that Vygotsky accorded to speech in the learning process. To Vygotsky, speech is an important mediating tool for human mental development. In a social interaction, speech that is used when experts and novices or peer groups collaborate to solve a problem mediates the movement from one level to a higher level in the learner's ZPD. In other words, during social interaction, speech serves to direct, or mediate the developmental process in the participants (Lantolf and Appel, 1994). Using the example of reciprocal teaching again (Palincsar and Brown, 1984), speech was used to support the students’ reading and the students in the reading programme had been shown to become more independent in their use of certain comprehension strategies that were modelled by their teachers and peers.

The speech involved during social interaction as discussed thus far is necessarily overt in its form and social in its function. Such social speech is distinguished from two other forms of speech – ‘egocentric speech’ and ‘inner speech’ (Vygotsky, 1986, p.32). According to Vygotsky, the egocentric speech of a child develops into the inner speech of an adult. Vygotsky reasoned that although a child’s egocentric speech (talking aloud to oneself) may disappear in terms of verbalisation, it does not atrophy but “goes underground”, i.e. turns into inner speech (verbal thought) (ibid, p.33). In addition, these two forms of speech also function as speech for oneself in contrast to the social speech that functions as speech for others. However, the inner speech of the adult would be richer, or more elaborate, than the egocentric speech of a child. Hence, egocentric speech and inner speech are similar but may be distinguished by the amount of verbalisation and degree of elaborateness. In addition, Vygotsky (1986, p.32) pointed out that one would find ‘striking similarities’ between the verbalisation of an adult when asked to solve problems thinking aloud and the egocentric speech of children. As such, both egocentric speech and inner speech will be viewed in this study as similar and also that thinking aloud in the present study can be seen as the verbalisation of inner speech.

More importantly and relevant to the present study is the role of inner speech in the development of cognitive functioning and its application to reading instruction. In his studies,

Vygotsky found that children use egocentric speech initially to accompany problem-solving strategies but later to direct problem-solving strategies (Lee, 2000). Vygotsky (1986), in one of his observations of a child, noted that the child's "provoked egocentric utterance so manifestly affected his activity that it is impossible to mistake it for a mere byproduct" (p.31). In other words, people, when faced with difficulties during a task, tend to talk to oneself or to think aloud in order to gain control of the task performance (McCafferty, 1994; Tinzmann, Jones, Fennimore, Bakker, Fine, and Pierce, 1990). Such views on the role of inner speech as 'aides for learning' (Afflerbach, 2000) have provided a framework for researchers to explore the potential utility of think-aloud as an instructional tool. Based on such Vygotskian perspectives, these researchers utilised thinking aloud in programmes meant to develop self-control and to teach thinking skills and problem solving (e.g. Meichenbaum, 1985; Meichenbaum and Goodman, 1971; Whimbey and Lochhead, 1976; 1986). Researchers in the field of reading have also sought to utilise think-aloud as an instructional tool in improving reading comprehension particularly through the acquisition of reading strategies (e.g. Baumann, et al., 1992; Bereiter and Bird, 1985; Nist and Kirby, 1986; Oster, 2001; Janzen, 1996; Thurmond 1986). Similarly, in this research, the utility of think-aloud in the instructional procedure is perceived from a Vygotskian perspective and intended for improving reading comprehension.

In sum, Vygotskian theory explicating the various inter-related concepts discussed above highlights the important function of inner speech and the value of social interaction in the development of cognitive processes such as reading. It can be said that the foundation for the approach that combines think-aloud and collaboration is grounded on such theoretical concepts.

### **Method**

In studying the effects of the group think-aloud technique, the study employed a quasi-experimental design (Campbell and Stanley, 1966, Cook and Campbell, 1979) using intact classes of ESL students in Universiti Pendidikan Sultan Idris (UPSI). More specifically, the quasi-experimental design adopted in this study was the nonrandomised control-group pretest-posttest design.

### **Subjects**

The subjects of this study were second semester (first year) Bachelor in Education (B.Ed.) undergraduates of Universiti Pendidikan Sultan Idris (UPSI). The subjects were enrolled in an English course required of every student in UPSI. Sixty-six (66) were initially selected for the study and assigned to an experimental group and a comparison group. Due to various reasons, however, the final number of students involved was 20 in the experimental group and 23 in the comparison group.

### **The Experimental Group**

The experimental group went through two aspects of the experimental treatment – a) training in think-aloud and b) reading lessons where think-aloud and class discussion were instrumental in the instruction given. After the administration of the pretest, the students were given training in think-aloud consisting of three sessions lasting one and a half hours each. The activities and procedures in the training sessions were taken from or adapted from procedures suggested by researchers whose work utilised think-aloud (as a research tool) and also the use of think-aloud as an instructional tool (Aebersold and Field, 1997; Cohen, 1990; Davey, 1983; Ericsson and Simon, 1993; Womack, 1991).

One of the main aims of the training was to introduce think-aloud to students and to enable them to carry out the procedure individually and in groups. This was essential in

preparing the students for the reading lessons where think-aloud played a prominent role in the small group reading sessions. Thus it was important to equip the students with the necessary skills needed so that they were able, willing and comfortable to think aloud while reading.

### **Reading Sessions**

The learning goal of the reading comprehension instruction provided to the experimental group was to enable students to become active and strategic readers in order to understand text better (Anderson and Roit, 1993). The instruction planned for the experimental group followed closely the aims, activities and steps carried out and suggested by Aebersold and Field (1997), Anderson and Roit (1993), and Janzen (1996).

Following Anderson and Roit (1993) one of the main focuses of the instruction was on detecting and treating problems as objects of inquiry which are to be discussed and resolved by the reading group. Another focus, which was corollary to the above, was encouraging the students to access, self-evaluate both their existing strategies and alternative strategies generated for understanding texts.

Instruction based on the focuses above entailed elements or classroom processes being espoused and investigated in the present study i.e. think-aloud and collaborative group work. Think-aloud by both the instructor and the students while reading was crucial. Essentially, the think-aloud by the instructor served as a model of expert reading processes and exhibited strategies used by good readers. Such modelling was first used during the think-aloud training sessions and it was used as and when was necessary during the reading lessons. In other words, think-aloud by the instructor was carried out only when it was necessary to provide additional examples or when requested by the students.

A consistent feature in the reading lessons was the encouragement of students to read and think aloud. Such activities were intended to establish habits for monitoring comprehension and to increase students' conscious awareness of the various problems faced and strategies used during reading. Although it was not expected of all the students to be equally competent in and comfortable with the technique, the students were expected to be able to do the think-aloud albeit at different levels of competence and confidence. Some students might have required more time and encouragement than others before they were wholly comfortable perhaps due to differences such as personality traits (introversion / extroversion) and learning styles (field independence / field dependence). All the same, as Janzen (1996, p.7) noted, "reading and thinking aloud at the same time presents a high cognitive load for L2 readers, yet not an impossible one".

Besides the extensive use of think-aloud, discussion in a collaborative situation was another prominent feature in the reading session. Most of the discussion, whether peer-led or teacher-led, revolved around the detection of problems, awareness and use of existing strategies, and the generation of alternative strategies in resolving reading problems. Generally, the students were asked to discuss (based on their think-aloud) what they did, the problems they had and the strategies they tried. The focus was on what worked, what did not, and why (Anderson and Roit, 1993).

### **Data Analysis**

In determining the effect (if any) of the experimental treatment, quantitative data collected through the pretest and the posttest was examined through statistical analyses. For the purpose of examining the effect of the experimental treatment, a research hypothesis corresponding to the research question was proposed. The hypothesis is as follow:

ESL students in the experimental group will obtain statistically higher mean scores in the reading comprehension test at the end of the experimental treatment compared to mean scores obtained by the ESL students in the comparison group who did not experience the experimental treatment.

In order to test the hypothesis given above, it was restated in the form of a null hypothesis as shown below:

Null Hypothesis

$$H_0 : \mu_1 = \mu_2$$

There is no significant difference between the mean scores in the reading comprehension test obtained by the ESL students in the experimental group at the end of the experimental treatment compared to the mean scores obtained by the ESL students in the comparison group who did not experience the experimental treatment.

Due to the lack of research base in studies similar to this present study, it was felt the hypothesis above should be stated as non-directional. Thus, a 2-tailed non-directional test was used and the level of significance was set at  $p < 0.05$ . This level follows the practice in most educational or applied linguistics research (Hatch and Lazaraton, 1991).

**Results**

In testing the null hypothesis, data consisting of pretest and posttest scores from experimental and comparison groups were obtained. As the design employed was quasi-experimental with non-randomised samples, data were analysed using the analysis of covariance (ANCOVA) to explore the difference between the groups (and to test the null hypothesis). The reading comprehension pretest was the covariate and the posttest was the dependent variable.

Means and standard deviations of scores for the reading comprehension pretest and posttest, as well as the adjusted means for the reading comprehension posttest, are shown in Table 1. Besides that, scatterplots were generated for both groups in the process of examining if assumptions for the use of ANCOVA were met.

*Table 1: Descriptive Statistics for Experimental and Comparison Groups at Pretest and Posttest*

Group	Pretest			Posttest		
	N	M	SD	M	M (Adjusted)	SD
Experimental	20	19.95	4.12	20.75	(20.50)	3.60
Comparison	23	19.17	4.17	18.00	(18.21)	4.10



The scatterplots showed a reasonable level of linearity between the dependent variable (posttest) and the covariate (pretest) for both groups. The interaction of the covariate with treatment was not statistically significant,  $F(1,39) = .14, p = .71$ , thus indicating that the homogeneity of regression slopes assumption was met. The Levene's test,  $F(1, 41) = .96, p > .05$ , *ns*, indicated that the homogeneity of variance assumption was also met. ANCOVA was carried out and the results are given below.

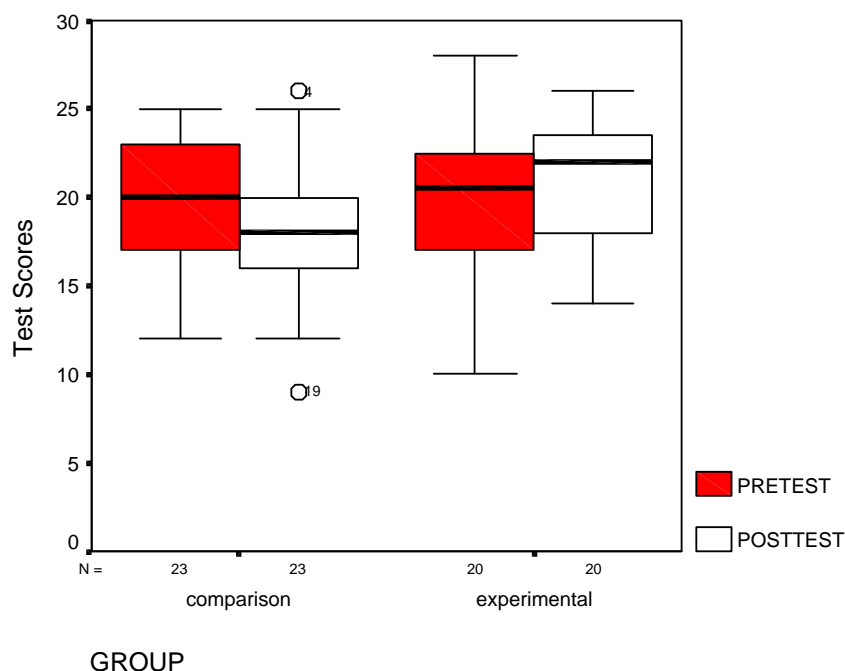
*Table 2: Analysis of Covariance of Reading Comprehension*

Source of variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between	55.69	1	55.69	6.02	.019
Within	369.83	40	9.25		

Results of the ANCOVA as shown in Table 2 above indicated that the main effects were statistically significant,  $F(1,40) = 6.02, p < .05$ . The null hypothesis was thus rejected and hence, the results showed that the students in the experimental group obtained higher reading comprehension scores than their counterparts in the comparison group after the instruction of using think-aloud in small groups.

Additionally, the better performance of the students in the experimental group was also indicated by the lower standard deviation (see Table 1) obtained in the posttest. Differences in the performances by both the experimental group and the comparison group can also be seen graphically in Figure 2 showing the distribution of test scores obtained by both the groups.

*Figure 2: Distribution of Test Scores*



In sum, the students who have used the procedure of think-aloud in small groups had performed better in their reading comprehension tests than those who did not use the said procedure.

### **Discussion and Conclusion**

Results of statistical analysis pointed to statistically significant differences between the performance in reading comprehension measures of the experimental and the comparison groups. In other words, the experimental group outperformed the comparison group on the reading measures. Hence, the instructional procedure had contributed to the improvement of the ESL students' reading comprehension.

This finding supports the use of think-aloud in reading instruction as advocated by reading researchers like Davey (1983), Ehlinger and Pritchard (1994), Nist and Kirby (1986), and Oster (2001). Additionally, it corroborates the findings from empirical studies, e.g. Baumann, Jones and Seifert-Kessell (1993), Bereiter and Bird (1985) and, Thurmond (1986), that examined the effects of think-aloud on reading comprehension in general and reading strategies in particular. More importantly, the finding provides further evidence on the usefulness of an approach in reading instruction that combines the elements of think-aloud with collaboration e.g. Anderson and Roit (1993), Klingner, Vaughn and Schumm (1998), Palincsar and Brown (1984), Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, and Brown. (1992). Thus, the empirical results of this present study suggest that the instructional procedure of think-aloud in a collaborative environment of a small group and which provide scaffolding should be considered as a technique in reading instruction for ESL students.

### **Pedagogical Implications**

The findings of the present study offer several implications for reading instruction or reading lessons in ESL contexts. The positive effect of the procedure implies that reading teachers have a potentially useful instructional technique in guiding ESL students to improve their reading comprehension. In other words, teachers should consider this approach to reading instruction as an additional technique to add to their repertoire of techniques that cater to various text types and purpose of reading. Nonetheless, teachers should also be aware of possible caveats when using the procedure. This is because, although the task of think-aloud during reading helped the students to be actively engaged with the text, it inevitably slowed down the rate of reading. Hence, it may not be suitable if the objective of the reading lesson was to encourage fluent reading or reading for leisure.

Another implication is that it would be beneficial for teachers to help students view reading as a problem solving activity and that there are various strategies that can be used to overcome the problems faced (Anderson and Roit, 1993; Block, 1992). Notwithstanding the importance of promoting such a view, teachers should also give priority to addressing the lack of language resources especially with low proficiency L2 students. As also pointed out by Yu-Fen (2002), being equipped with knowledge of strategies or ability to monitor comprehension would not be sufficient "if they have no basic resources to access when attempting to solve problems" (p.37). Similarly, Pressley (2000, p.551) expressed the view that "if word-level processes are not mastered (i.e. recognition of most words are not automatic), it will be impossible to carry out higher order processes that are summarized as reading comprehension strategies". Although working collaboratively in a group helps alleviate this lack of resources when students pool their resources together, it may still not be enough to solve the problems faced. Furthermore, students will frequently need to read independently without the help of friends and such a lack of basic language knowledge would certainly be felt.

Since most students may not find think-aloud something easy to do at the beginning, it is important that practice sessions be given to the students. These practice sessions also should start with something relatively easy, for example verbalising while doing mathematical additions, and progressing slowly to thinking aloud while reading which could be quite demanding. Advocates of think-aloud such as Cohen (1990), and Ericsson and Simon (1993) have designed practice sessions and guidelines for the use of the technique. Besides that, these practices need also be carried out on an individual basis to ensure familiarity before moving on to pair and group levels.

While providing students with sufficient time and practice to familiarise themselves with the procedure, teachers should also be aware that there are possibly some students who will not find the procedure comfortable to use and especially so in a group due to learner differences mentioned earlier. Furthermore, when the practice period is over, the teacher could perhaps allow the students to determine their own group members so that they will at least not feel uncomfortable in the group. However, if such is the case, the teacher should ensure that at least one member of the group is of higher proficiency and reading ability who can play the role of a knowledgeable peer so that the instructional procedure can be beneficial.

Finally, while think-aloud by the students themselves is crucial in the instructional procedure examined in this study, think-aloud by the teachers themselves is also essential. This is because the teacher would be required to think aloud so as to model comprehension processes and to provide examples of think-aloud itself before encouraging students to use it. As with any other instructional procedures that require the use of think-aloud as part of the instruction, the underlying assumption is that the teachers themselves are proficient and comfortable in carrying out think-aloud. However, McEwan (2004) and Jongsma (1999) pointed out that some teachers are uncomfortable in using think-aloud and are uncertain in how to help their students become proficient in it. Thus, this implies the need for training teachers to be proficient in think-aloud considering the many potential benefits of using think-aloud in the reading classroom.

### **Limitations**

The methodology used in the collection and analysis of data in this present study was deemed most appropriate in relation to the aims and research questions of the study. Nonetheless, there are various limitations to the study arising from the various necessary decisions that needed to be made in the course of carrying out the research.

Therefore, the findings and pedagogical implications discussed thus far should be viewed in light of various limitations in the study. One limitation pertained to the use of the quasi-experiment in the quantitative aspect of the overall mixed-method design. As Hatch and Lazaraton (1991) pointed out, due to the inherent nature of quasi-experiments in using non-randomised samples in the experiment, the statistical test results provided confidence that the differences were real in this set of data only and therefore the results should be interpreted cautiously for inferential purposes. In other words, the results most probably was not able to provide enough evidence of causal effects but perhaps provide some support for use of the treatment. Therefore, while the use of quasi-experiment was reasonable based on the aims of the study, the data and the results of the experiment should be interpreted cautiously. The results, nonetheless, have given us some level of insight in the present study pertaining to the efficacy of the reading instruction using think-aloud in small groups.

Additionally, the integrated approach to instruction in the intact class wherein the experimental treatment was given might pose another limitation to the present study. This is because the instruction given in the intact class was not solely for improving reading

comprehension but also for improving other aspects of the target language such as writing, speaking, grammar, and vocabulary. Although this possible threat to internal validity was to a certain extent controlled for by having a comparison group, there is the need to be cautious in attributing effects to the experimental treatment.

Moreover, that the experimental group received the treatment from the researcher himself was a potential limitation to the study. Following Baumann et al. (1992), Klingner et al. (1998), and Palincsar and Brown (1984) it was also thought important to carry out the instruction by the researcher first before asking classroom teachers to do so. Hence, in doing so, as pointed out by Baumann et al. (1992), the internal validity of the experiment was enhanced but its external validity diminished. Future research is needed to determine if the results and findings of the study can be replicated when regular classroom teachers are trained to implement the treatment.

### **Future Research**

The present study has provided valuable answers to the questions set earlier on. Nonetheless, based on the findings and limitations discussed above a few suggestions are appropriate as to how future research can further verify the efficacy of the proposed instructional technique. First of all, follow-up studies involving true experimental designs will be needed to determine if the results of this study could be replicated. In the same vein, the studies should also include training regular classroom teachers to implement the treatment in the experimental groups.

Besides that, these follow-up studies might include testing the instructional procedure with a variety of populations such as students with different language backgrounds, L2 proficiency levels, gender and age. Cohen (1998, p.15) pointed out that strategies “do not operate by themselves” but are closely linked to one’s learning styles, personality-related variables, sex, age and ethnic differences. Hence, researchers should also try to identify variables such as those mentioned that may affect the students’ performance since these variables are possible factors in determining how students react to thinking aloud in small groups.

### **Conclusion**

The results of the quasi-experiment showed that combining think-aloud with collaboration in a small group has contributed to enhancing the reading comprehension of ESL students. However, in view of the several limitations discussed earlier, the results and findings of this study should be interpreted cautiously and that generalisations are limited to the scope of the sample, instructional procedures, and research procedures employed. Directions for future research have been suggested to further examine the efficacy of using think-aloud in a collaborative environment. The present study, nonetheless, provides positive indications on the usefulness of an instructional technique that combines think-aloud and collaboration in improving reading comprehension.

### References

- Aebersold, J.A., & Field, M.L. (1997). *From Reader to Reading Teacher: Issues and strategies for second language classroom*. Cambridge: Cambridge University Press.
- Afflerbach, P. (2000). Verbal reports and protocol analysis. In Kamil, M., Mosenthal, P., Pearson, D., & Barr, R. (Eds.). *Handbook of Reading Research Volume III* (pp.163-179). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Almasi, J.F., McKeown, M.G., & Beck, I.L. (1996). The nature of engaged reading in classroom discussions of literature. *Journal of Literacy Research*, 28 (1), 107-146.
- Anderson, V.A., & Roit, M. (1993). Planning and implementing collaborative strategy instruction for delayed readers in Grades 6-10. *The Elementary School Journal*, 94(2), 121-137
- Baumann, J. F. Jones, L.A., & Seifert-Kessell, N.(1993). *Monitoring Reading Comprehension by Thinking Aloud. Instructional Resource No.1*. ERIC Document Reproduction Services, ED 360 612
- Baumann, J.F., Seifert-Kessell, N., & Jones, L.A. (1992) Effect of think-aloud instruction on elementary students' comprehension monitoring abilities. *Journal of Reading Behavior*, 24(2), 143-172
- Beck, I.L., McKeown, M.G., Worthy, J., Sandora, C.A., & Kucan, L. (1996). Questioning the author: A yearlong classroom implementation to engage students with text. *The Elementary School Journal*, 96 (4), 385-414.
- Bereiter, C., & Bird, M. (1985). Use of thinking aloud in identification and teaching of reading comprehension strategies. *Cognition and Instruction*, 2(2), 131-156
- Block, E. (1986). The comprehension strategies of second language readers. *TESOL Quarterly*, 20, 463-494.
- Block, E. (1992). See how they read: Comprehension monitoring of L1 and L2 readers. *TESOL Quarterly*, 26, 319-343
- Brown, A.L., Metz, K.E., & Campione, J.C. (1996). Social interaction and individual understanding in a community of Learners: The influence of Piaget and Vygotsky. In Tryphon, A. & Voneche, J. (Eds.). *Piaget – Vygotsky: The social genesis of thought* (pp. 145-170). Sussex: Psychology Press.
- Campbell, D.T., & Stanley, J.C. (1966). *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin Company.
- Cazden, C.B. (1993). Language, cognition, and ESL literacy: Vygotsky and ESL literacy teaching. *TESOL Quarterly*, 27, 172-176.
- Cohen, A.D. (1990). *Language Learning: Insights for learners, teachers, and researchers*. New York: Newbury House.

- Cohen, A.D. (1996). Verbal reports as a source of insights into second language learner strategies. *Applied Language Learning*, 7(1&2), 5-24.
- Cohen, A.D. (1998). *Strategies in Learning and Using a Second Language*. London: Longman.
- Cohen, A.D., & Hosenfeld, C. (1981). Some uses of mentalistic data in second language research. *Language Learning*, 31(2), 285-313.
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-Experimentation: Design and analysis Issues for field settings*. Boston: Houghton Mifflin Company.
- Crain-Thoreson, C., Lippman, M.Z., & McClendon-Magnuson, D. (1997). Windows on Comprehension: Reading comprehension processes as revealed by two think-aloud procedures. *Journal of Educational Psychology*, 89(4), 579-591.
- Davey, E. (1983). Think aloud – Modeling the cognitive processes of reading comprehension. *Journal of Reading*, 27, 44-47
- Donato, R. (1994) Collective scaffolding in second language learning. In J.P. Lantolf & G. Appel (Eds.). *Vygotskian Approaches to Second Language Research* (pp.33-56). Norwood, NJ: Ablex Publishing.
- Ehlinger, J., & Pritchard, R. (1994). Using think alongs in secondary content areas. *Reading Research and Instruction*, 33(3), 187-206.
- Elekes, K. (1997). “Please, keep talking”: The ‘think-aloud’ method in second language reading research. *Novelty*, 7: <http://www.novelty.hu/htm2/vol73/elekes.html>
- Ericsson, K.A., & Simon, H.A. (1987). Verbal reports on thinking. In C. Faerch & G. Kasper (Eds.) *Introspection in second language research* (pp. 24-53). Clevedon: Multilingual Matters.
- Ericsson, K.A., & Simon, H.A. (1993). *Protocol analysis: Verbal reports as data* (Rev. ed.). Cambridge, MA: MIT Press.
- Faerch, C., & Kasper, G. (1987). *Introspection in second language research*. Clevedon: Multilingual Matters.
- Forman, E.A., & Cazden, C.B. (1991). Exploring Vygotskian perspectives in education: The cognitive value of peer interaction. In R. Barr, M.L. Kamil, P.B. Mosenthal, & P.D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 155-178). New York: Longman.
- Gaffney, J.S., and Anderson, R.C. (2000). Trends in reading research in the United States: Changing intellectual currents over three decades. In Kamil, M., Mosenthal, P., Pearson, D., & Barr, R. (Eds.). *Handbook of Reading Research* Volume III (pp.163-179). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Garrison, J. (1995). Deweyan pragmatism and the epistemology of contemporary
- Glaser, R. (1991). The maturing of the relationship between the science of learning and cognition and educational practice. *Learning and Instruction, 1*, 129-144.
- Hatch, E. and Lazaraton, A. (1991). *The Research Manual: Design and statistics for applied linguistics*. Boston, MA: Heinle and Heinle Publishers.
- Hosenfeld, C. (1984). Case studies of ninth grade readers. In J.C. Alderson & A.H. Urquhart (Eds.), *Reading in a foreign language* (pp. 231-249). London: Longman.
- Janzen, J. (1996). Teaching strategic reading. *TESOL Journal, 6*(1), 6-9.
- Jaramillo, J.A. (1996). Vygotsky's sociocultural theory and contributions to the development of constructivist curricula. *Education . 117*(1), pp. 133-140.
- Johnson, D.W., & Johnson, R.T. (1999). *Learning Together and Alone: Cooperative, competitive, and individualistic learning* (5<sup>th</sup> Ed.). MA: Allyn and Bacon.
- Jongsma, K. (1999). Vocabulary and comprehension strategy development. *The Reading Teacher . 53*(4),.310.
- Kamhi-Stein, L.D. (1998). Profiles of underprepared second-language readers. *Journal of Adolescent and Adult Literacy. 41* (8), .610-619
- Klingner, J.K., Vaughn, S., & Schumm, J.S. (1998). Collaborative strategic reading during social studies in heterogeneous fourth-grade classrooms. *The Elementary School Journal, 99*(1), 3-22.
- Kucan, L. & Beck, I. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review of Educational Research, 67*, 271-299.
- Lantolf, J.P., & Appel, G. (1994) Theoretical Framework: An introduction to Vygotskian approaches to second language research. In J.P. Lantolf & G. Appel (Eds.). *Vygotskian Approaches to Second Language Research* (pp. 1-32). Norwood, NJ: Ablex Publishing.
- Lee, C.D. (2000). Signifying in the zone of proximal development. In C.D. Lee, & P. Smagorinsky (Eds.) *Vygotskian Perspectives on Literacy Research: Constructing meaning through collaborative inquiry* (pp. 191-225). Cambridge: Cambridge University Press.
- McCafferty, S.G. (1994). The use of private speech by adult ESL learners at different levels of proficiency. In J.P. Lantolf & G. Appel (Eds.). *Vygotskian Approaches to Second Language Research* (pp. 117-134). Norwood, NJ: Ablex Publishing.
- McEwan, E.K. (2004). *Seven Strategies of Highly effective Readers: Using cognitive research to boost K-8 achievement*. Thousand Oaks: Corwin Press

- Meichenbaum, D. (1985). Teaching thinking: A cognitive-behavioral perspective. In S.F. Chipman, J.W. Segal, & R. Glaser (Eds.), *Thinking and learning skills: Research and open questions* (Vol. 2, pp.407-426). Hillsdale, NJ: Erlbaum.
- Meichenbaum, D., & Goodman, J. (1971). Training impulsive children to talk to themselves: A means of developing self-control. *Journal of Abnormal Psychology*, 77, 115-126.
- Newell, A., & Simon, H.A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.
- Nist, S.L., & Kirby, K. (1986). Teaching comprehension and study strategies through modeling and thinking aloud. *Reading Research and Instruction*, 25(4), 254-264.
- Nystrand, M., & Gamoran, A. (1991). Instructional discourse, student engagement, and literature achievement. *Research in the Teaching of English*, 25, 261-290.
- Olshavsky, J.E. (1977). Reading as problem solving: An investigation of strategies. *Reading Research Quarterly*, 7(4), 654-674.
- Oster, L. (2001). Using the think-aloud for reading instruction. *Reading Teacher*; 55 (1), 64-69
- Palincsar, A.S., & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1(2), 117-175
- Pressley, M. (2000). What should comprehension instruction be the instruction of? In Kamil, M., Mosenthal, P., Pearson, D., & Barr, R. (Eds.). *Handbook of Reading Research Volume III* (pp.163-179). Hillsdale, NJ: Lawrence Erlbaum Associates
- Pressley, M. & Afflerbach, P. (1995). *Verbal Protocols of Reading: The Nature of Constructively Responsive Reading*. Hillsdale NJ: Lawrence Erlbaum
- Pressley, M., El-Dinary, P.B., Gaskins, I., Schuder, T., Bergman, J.L., Almasi, J., & Brown, R. (1992). Beyond direct explanation: transactional instruction of reading comprehension strategies. *The Elementary School Journal*, 92(5), 513-555.
- Richek, M.A., Caldwell, J.S., Jennings, J.H., and Lerner, J.W. (1996). *Reading Problems: Assessment and teaching strategies (3<sup>rd</sup> Ed)*. MA: Allyn & Bacon.
- Rosenshine, B., & Meister, C. (1998). The use of scaffolds for teaching higher-level cognitive strategies. In A.E. Woolfolk (Ed.), *Readings in Educational Psychology* (2<sup>nd</sup> Ed., pp. 137-145) Boston: Allyn and Bacon.
- Taylor, M., King, J., Pinsent-Johnson, C., & Lothian, T. (2003). Collaborative practices in adult literacy programs. *Adult Basic Education* .13(2), 81-99
- Thurmond, V.B. (1986). Analytical reading: A course that stresses thinking aloud. *Journal of Reading*, 30, 729-732.



- Tierney, R.J., Readance, J.E., & Dishner, E.K. (1990). *Reading strategies and practices: A compendium* (3<sup>rd</sup> ed.). Boston: Allyn & Bacon.
- Tinzmann, M.B., Jones, B.F., Fennimore, T.F., Bakker, J., Fine, C., and Pierce, J. (1990). *What is the Collaborative Classroom?* North Central Regional Educational Laboratory. Oak Brook. Available at [http://www.ncrel.org/sdrs/areas/rpl\\_esys/collab.htm](http://www.ncrel.org/sdrs/areas/rpl_esys/collab.htm)
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Vygotsky, L.S. (1986). *Thought and Language* (A. Kozulin, Ed. & Trans.). Cambridge, MA: MIT Press.
- Wells, G. (2000). Dialogic inquiry in education: Building on the legacy of Vygotsky. In C.D. Lee, & P. Smagorinsky (Eds.) *Vygotskian Perspectives on Literacy Research: Constructing meaning through collaborative inquiry* (pp. 51-85). Cambridge: Cambridge University Press.
- Wertsch, J.V. (1991). *Voices of the Mind: A sociocultural approach to mediated action*. Hertfordshire: Harvester Wheatsheaf.
- Wertsch, J. V. & Tulviste, P. (1992). L.S. Vygotsky and contemporary developmental psychology. *Developmental Psychology*, .28. No. 4, 548-557.
- Whimbey A., & Lochhead, J. (1986). *Problem solving and comprehension* (4<sup>th</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Womack, R.J. (1991). *The Effects of Think Aloud on Student Ability to Identify Main Ideas in Reading Passages*. Unpublished EdD Dissertation: University of Maryland College Park.
- Yu-Fen, Yang. (2002). Reassessing readers' comprehension monitoring. *Reading in a Foreign Language*, 14(1),.18-42. Available at <http://www.nflrc.hawaii.edu/rfl>

**Goh Hock Seng, PhD** has taught in a secondary school and teacher training colleges and is presently a senior lecturer at Universiti Pendidikan Sultan Idris, Malaysia. His areas of interest include Reading, Teacher Education, TESL Methodology, and Applied Linguistics. Any correspondence may be addressed to [goh@upsi.edu.my](mailto:goh@upsi.edu.my)