Journal of Thai Interdisciplinary Research
Volume 13, Number 4, Pages 1 - 6

# Effects of zone of proximal development based scaffolding techniques on reading comprehension of Thai university students

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## Abstract

This present study aimed to investigate the effects of ZPD based scaffolding techniques on reading comprehension and attitudes of Thai University Students and identify the major obstacles in the reading session of English compulsory course 1 at Nakhon Pathom Rajabhat University. The participants were forty eight first year students from various faculties. Questionnaires were distributed to all subjects. The data obtained through questionnaires were then computed and quantitatively analyzed by utilizing the SPSS program. In general, the results from t-test and Delayed Post-Test revealed the positive effect of the ZPD based scaffolding techniques in enhancing reading comprehension for students. Moreover, the results also indicated the prospects of positively supporting the incorporation of ZPD based scaffolding techniques in teaching. Additionally, the overall results showed that each of the fifteen survey items had effects on students' attitudes. In addition, the findings unveiled that there were some other concerning points when applying the techniques to classroom. The pedagogical implementation will also be discussed.

**Keywords**: scaffolding techniques, zone of proximal development, reading comprehension, attitudes, obstacles

**Article history:** Received 2 April 2018, Accepted 11 June 2018

## 1. Introduction

In the Thai educational system, reading is regarded as an important skill for studying at university level. As Adunyarittigun [1] mentioned, university students who are not capable of English decoding and reading comprehension always face difficulty in fulfilling their study objectives. This has major impact on students in acquiring knowledge and expanding their areas of study.

Lev Vygotsky, an influential psychologist, proposed the basic concept called Zone of Proximal Development (ZPD) which refers to the distance between what learners can do with and without guidance or assistance [2]. Later, it was developed by other psychologists, particularly Jerome Bruner, who developed the concept of scaffolding used as the framework for adults to guide the development of children [3]. However, there are still some weak points that the socio-cultural scholars need to further study in order to fill gaps and improve this approach [4].

### 1.1 Objectives of the study

The objectives of this study are the following:

1.1.1 To investigate if the ZPD based scaffolding techniques have the effect on students' reading comprehension.

1.1.2 To gauge if the ZPD based scaffolding techniques have the effect on students' reading comprehendsion as measured by a delayed posttest.

1.1.3 To examine students' attitudes towards the ZPD based scaffolding techniques.

1.1.4 To identify the major obstacle(s) that teachers should consider before applying ZPD scaffolding techniques in teaching reading at university level.

### 1.2 Zone of proximal development in Vygotsky's theoretical perspective

The Zone of Proximal Development was introduced by Vygotsky [5] as a part of a general analysis about child development. He stated that children's learning will not occur after they are put in school and begin studying, but it will start in the preschool years when they are at home. For instance, they start learning arithmetic in daily life such as how to determine the size, or to divide something. Moreover, when they indicate objects, the children will naturally ask parents or adults in order to know how to name these items, and start to assimilate these inputs after getting the answer, then acquire the information. That is to say, the children develop their learning and can internalize their speech through the interaction with the others [6]. They further develop until they are able to function in some specific developmental stages by guidance gained from the experience [3]. The basic understanding leads to the meaning of the Zone of Proximal Development outlined by Vygotsky [5] as follows:

"It is the distance between the actual development levels as determined by independent problem solving

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DOI 10.14456/jtir.2018.33

and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers."

**1.3 How the role of teacher, and more advanced peers can help improve students in learning English.**

According to Vygotsky, one of the key factors for success is the role of the teacher or of more experienced peers [6]. They take the crucial role to provide the guidance, advice, and artifices to the child to motivate his or her learning to internalize and function at the highest potential level [3]. It also was pointed out by Beliavsky [7] that the instruction could not happen in isolation, but it will occur in the joint interaction between the child and more knowledgeable or advanced people. During the interacting, the more experienced person will support new concepts or knowledge being added to the previous understanding, and help children to realize concepts by themselves.

**1.4 Scaffolding as teaching techniques in classroom**

Scaffolding instruction strategy is originally from Lev Vygotsky's sociocultural theory and the concept of the zone of proximal development (ZPD). "The zone of proximal development is the distance between what children can do by themselves and the next learning that they can be helped to achieve with competent assistance" [8]. The scaffolding teaching strategy supports individualized assistance based on the learner's ZPD [9]. In scaffolding instruction strategy a more advanced individual provides scaffolds to facilitate the learner's development. The strategy facilitates a student's ability to build on prior knowledge and create new information. The activities in scaffolding instruction are just more than the level of what the learner can do by themselves [10]. The more advanced other provides the supports so that the learner can achieve (with assistance) the tasks that the learner could otherwise not complete, thus assisting the learner through the ZPD [11].

## 2. Materials and methods

**2.1 Participants**

In this research, forty-eight first year non-English major students from several majors who were studying the English for Everyday Communication (English compulsory Course 1) in the academic year 2015 at Nakhon Pathom Rajabhat University in Nakhon Pathom Province, Thailand, were asked to participate in this study.

**2.2 Materials**

The instruments used in the study were t-test and Delayed Post-Test which were adapted from Reading Comprehension Part of TOEIC Test and a set of questionnaire which was designed to meet the purpose of the study. Moreover, both of the tests were validated by three experts. Additionally, a 5 point Likert scale ranging from 5 to 1 questionnaire with open-ended questions was designed by the researcher using the information based on the scaffolding theory, and the 'Zone of Proximal Development' [5, 12, 13] and was edited by the native speakers.

**2.3 Procedures**

2.3.1 In this study, the participants were provided with the treatment (intervention) during the research process. The treatment in the class was the offers of step by step assistance or guidance to students when they encountered more complicated task missions in order for them to be able to accomplish or resolve the problems alone.

2.3.2 Pre-test was given to the participants on the 2nd class of the course. After the 12th class, the post-test was administered to the participants. Finally, the 15th class, the delayed post-test was distributed. According to Schmitt [14] "a delayed posttest of three weeks should be indicative of learning which is stable and durable" (p.157). The delayed posttest was administered to investigate the retention of what they have studied.

2.3.3 The questionnaires were made in two versions: English, and Thai version. The Thai version was distributed to students as the researcher felt that it would be better understood by the respondents.

2.3.4 Before distributing the questionnaires to the subjects, it was tried out with students from another group who were studying the same subject as the respondents were, in the same academic year at Nakhon Pathom Rajabhat University.

2.3.5 The respondents were asked to rate items. All questionnaires were collected once the subjects completed the questionnaires.

2.3.6 The data of t-test/delay post-test, and questionnaires were scored according to the data analysis procedure by keying the collected information into a computer, and the results were calculated.

**2.4 Data analysis**

The framework for data analysis was based on the SPSS which was used to analyze data gained from t-test and delayed post-test, and the first and second part of the questionnaire in order to get the descriptive statistics as well as the third part of the questionnaires, which was about the concerning points of teaching techniques used, was interpreted and summed up using a grouping technique.

## 3. Results and Discussion

The results showed most of respondents were 29 males (60.4%) and 19 females (39.6%), with the age of 18 years old (33 students, 68.7%), and the majority of students were from the Faculty of Science and Technology majoring in Computer Science (38 students, 79.2%).

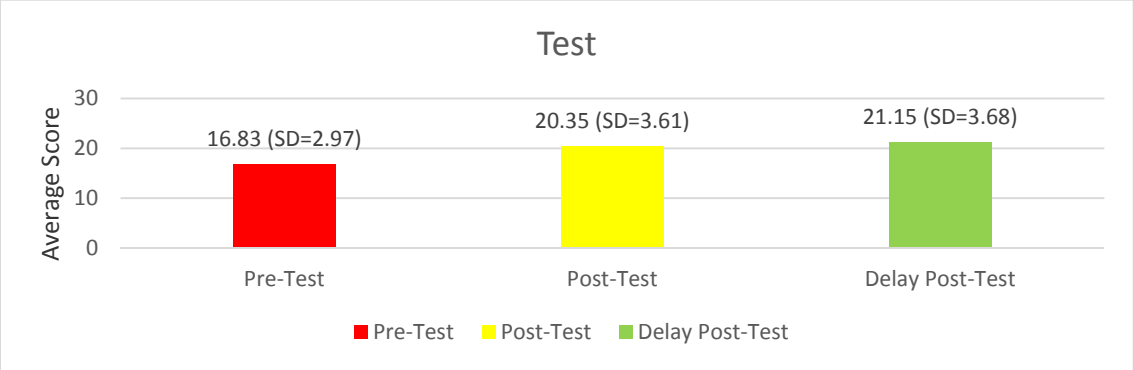


**Figure 1** Overall performance in pre-test, post-test and delayed post-test

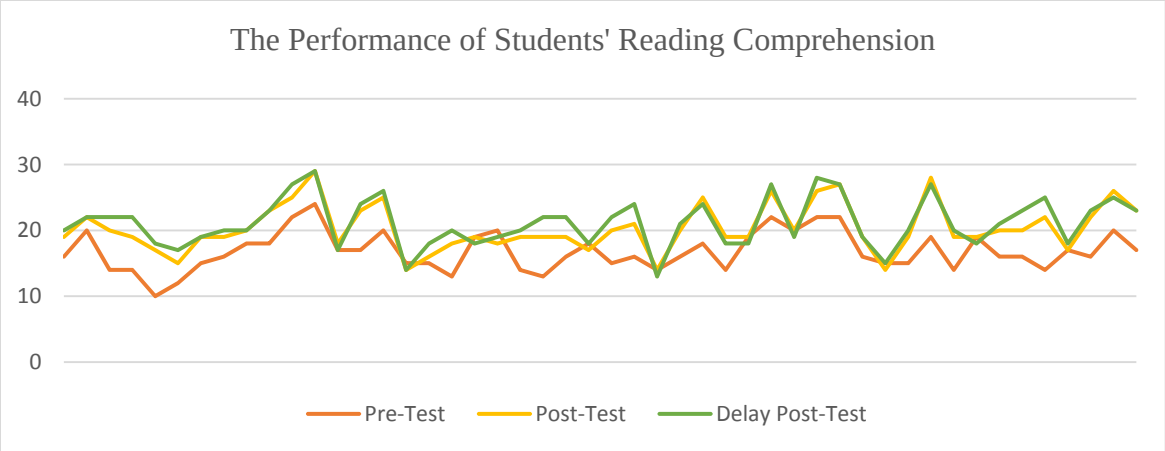


**Figure 2** Performance in pre-test, post-test and delayed post-test

**3.1 Analysis of pre-test, post-test & delayed post-test**

As can be seen from Figure 1, the findings from the pre-test, the average scores of students' reading comprehension performance was at 16.83 (SD = 2.97). Furthermore, the post-test revealed the average scores of students' reading comprehension performance at 20.35 (SD = 3.61). Lastly, the delay post-test has shown the average scores of students' reading comprehension performance at 21.15 (SD = 3.68).

As can be seen from Figure 2, which represents the performance of the students' reading comprehension in t-test and delayed post-test. In the pre-test, it is obvious that the highest score was at 24. Moreover, the average score was at 16. On the other hand, the lowest score of the pre-test was at 10. With respect to the post-test, the highest point was scored at 29. Also, 20 marks was reported as the average point, whereas 14 marks was reported as the lowest points of the post-test. Eventually, the highest score of the delay post-test was at 29. Additionally, the average score was reported as 21, whereas, the lowest score was reported as 13.

This part revealed the findings obtained from the fifteen items in the questionnaires concerning the teaching techniques of ZPD based scaffolding techniques used in the classroom while students were studying in the English reading session.

**3.2 The respondents' attitudes towards the teaching techniques of the Zone of Proximal Development.**

As can be seen from table 3, the findings revealed that the participants' overall attitudes were rated at the high level ($\bar{x}$ = 4.15, SD = 0.81). The means of the participants' attitudes ranged from 4.70 (SD = 0.58; item number 1: Teacher provided directions clearly, and explained what a student must do to meet expectations.) to 3.24 (SD = 1.27; item number 10: The teacher used leading questions to guide students, for instance, asking questions related to learners' background knowledge such as asking learners what event is going to happen, currently happening, should or should not happen), revealing a high level of approval to the moderate level of approval. However, item number 10 was the only item reported at the moderate level, and it can also be

**Table 1** Summary of the students' attitudes towards the ZPD based scaffolding techniques

| The teaching techniques and methods | Totally like 5 | | Like 4 | | Average 3 | | Dislike 2 | | Totally dislike 1 | | Mean ($\bar{X}$) | Standard Deviation (S.D.) | Attitude Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | | | |
| 1. Teacher provided directions clearly, and explain what a student must do to meet expectations. | 36 | 75 | 9 | 18.75 | 3 | 6.25 | - | - | - | - | 4.70 | 0.58 | High |
| 3. Teacher offered assistance to students when students encounter complicated tasks. | 30 | 62.5 | 16 | 33.3 | 2 | 4.1 | - | - | - | - | 4.40 | 0.63 | High |
| 12. The relaxing atmosphere (rapport of teacher and students) in the class helped encourage students to learn more. | 23 | 47.9 | 24 | 50 | 1 | 2.1 | - | - | - | - | 4.31 | 0.70 | High |
| 7. Teacher monitored and observed in order to offer help when needed. | 22 | 45.8 | 25 | 52.1 | 1 | 2.1 | - | - | - | - | 4.26 | 0.76 | High |
| 8. Teacher showed no frustration when students were asking for assistance or unable to go through the tasks because of the difficulty (no pressure on students). | 21 | 43.8 | 19 | 39.6 | 4 | 8.3 | 4 | 8.3 | - | - | 4.23 | 0.82 | High |

**Table 2** Summary of the students' attitudes towards the ZPD based scaffolding techniques

| The teaching techniques and methods | Totally like 5 | | Like 4 | | Average 3 | | Dislike 2 | | Totally dislike 1 | | Mean ($\bar{X}$) | Standard Deviation (S.D.) | Attitude Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | | | |
| 2. Teacher tried to make reading topics more interesting to students using pictures, tables, outlines, and graphs. | 18 | 37.5 | 24 | 50 | 6 | 12.5 | - | - | - | - | 4.23 | 0.70 | High |
| 14. Group-work was helpful for students to interact with the advanced peers independently to have better understanding. | 17 | 35.4 | 25 | 52.1 | 3 | 6.25 | 3 | 6.25 | - | - | 4.24 | 0.67 | High |
| 4. Teacher observed and analyzed the critical features and differences between what has been produced and correct forms or situations. | 17 | 35.4 | 22 | 45.8 | 5 | 10.4 | 4 | 8.4 | - | - | 4.19 | 0.83 | High |
| 9. Teacher recommended and provided useful sources to learners such as studying via the reading practice program on the internet or newspapers. | 16 | 33.3 | 24 | 50 | 7 | 14.6 | 1 | 2.1 | - | - | 4.20 | 0.81 | High |
| 13. Peers' assistance such as explanations and vocabulary knowledge gave lower level students better understanding of the reading tasks. | 16 | 33.3 | 20 | 41.2 | 6 | 12.5 | 6 | 12.5 | - | - | 4.15 | 0.85 | High |

**Table 3** Summary of the students' attitudes towards the ZPD based scaffolding techniques

| The teaching techniques and methods | Totally like 5 | | Like 4 | | Average 3 | | Dislike 2 | | Totally Dislike 1 | | Mean ($\bar{X}$) | Standard Deviation (S.D.) | Attitude Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | | | |
| 11. The guidance from the teacher facilitated students in terms of solving reading problems by themselves. | 14 | 29.2 | 20 | 41.2 | 10 | 20.8 | 4 | 8.3 | | | 4.11 | 0.78 | High |
| 6. Teacher provided the tasks which were appropriate to students' levels. | 14 | 29.2 | 21 | 43.75 | 8 | 16.7 | 5 | 10.4 | - | - | 4.15 | 0.87 | High |
| 15. The guidance from advanced peers assisted low level students in terms of solving reading problems independently. | 13 | 27.1 | 19 | 39.6 | 12 | 25 | 4 | 8.4 | - | - | 3.89 | 0.91 | High |
| 5. Teacher maintained and followed the reading objectives (not out of teaching topic). | 12 | 25 | 16 | 33.3 | 11 | 22.9 | 9 | 18.75 | - | - | 3.82 | 1.00 | High |
| 10. The teacher used leading questions to guide students for instance asking questions related to learners' background knowledge such as asking learners what event is going to happen, currently happening, should or should not happen. | 10 | 20.8 | 13 | 27.1 | 10 | 20.8 | 11 | 22.9 | 4 | 8.4 | 3.24 | 1.27 | Moderate |
| **Total** | | | | | | | | | | | 4.15 | 0.81 | High |

seen that this item was reported as in the scale of totally like by only 10 students, or 20.8%, like by 13 students, or 27.1%, average by 10, or 20.8%, dislike by 11 students, or 22.9%, and totally dislike by 4 students, or 8.4%. This illustrates that students did not like when the technique in item 10 was used with them in the classroom.

### 3.3 Respondents' concerns of applying the scaffolding techniques

From this research, ZPD based scaffolding techniques had positive effect on students' reading comprehension. With reference to Lev Vygotsky's sociocultural theory and the concept of the zone of proximal development (ZPD), scaffolding instruction strategy a more advanced individual provides scaffolds to facilitate the learner's development. The strategy facilitates a student's ability to build on prior knowledge and create new information. The activities in scaffolding instruction are just more than the level of what the learner can do by themselves [10]. The more advanced other provides the supports so that the learner can achieve (with assistance) the tasks that the learner could otherwise not complete, thus assisting the learner through the ZPD [11]. This finding was consistent with Vygotsky's theory of ZPD. He supported that that scaffolding instruction as the "role of teachers and others in supporting the learner's development and providing support structures to get to that next stage or level" [15].

Regarding the results from the lowest average score from item 10, it has shown that students had negative attitude towards this item (to ask questions to guide what the child should say next" or to use leading questions to guide students), proposed by Wood and et al [13], on the other hand, it de-motivated and also discouraged students from participating in the class.

Therefore, the results of this study did not support the idea proposed by Wood and et al [13]. However, teachers who are going to use this technique in item number would have to be aware of any differences in cultural contexts before applying this technique in the classroom in order to prevent students from having negative attitude towards the technique, the teacher, and the reading classroom. Moreover, the responses by some of the students for example they would prefer a teacher not to ask them a question, because some of them said they felt embarrassed when the teacher asked questions or tried to have them speak, but they could not answer. To put it more simply, it was because these students were laughed at when they answered incurrectly. However, the technique did not prove to be a beneficial technique for students in terms of guidance, but it produced some negative attitudes and drawback from these students. This might happen because of the cultural context or be related to the personal background that students have experienced. So, teachers who are

going to use this technique would have to be aware of different cultural contexts before applying this technique in the class

## 4. Conclusion and Suggestion

### 4.1 Conclusion

This study aimed at investigating effects of ZPD based scaffolding techniques on students' reading comprehension. The subjects were first year students at Nakhon Pathom Rajabhat University in a reading session of a compulsory English Course. The study focused on students' reading comprehension and students' attitudes towards the teaching techniques which were applied in the class. Additionally, other relevant points were also reported. The data were obtained from the instrument based on the theory of ZPD and scaffolding characteristics created by Vygotsky, McKenzie, and Wood and et al [5, 12 & 13]. The findings would be significantly beneficial for pedagogical course, in terms of in giving information which can help raise the awareness of how to implement the investigated teaching techniques in the reading class, promoting the better understanding towards students' attitudes before implementing the techniques to a reading class, and additionally can be considered as a means of guidance for instruction development. With reference to these research findings, they appear to point to the need on adapting the techniques in terms of the obtained information and the reported concerns of students, which need to be considered prior to applying the techniques into any reading class, in order to improve practices in instructional development.

### 4.2 Suggestion

Though some positive findings were identified in this study to support the effectiveness of the techniques in enhancing the reading comprehension skill and also the attitudes of language learners, some limitations of this study may be noted before the results will be generalized.

4.2.1 This study had limitations because the participants were only first year students studying English in a compulsory course at Nakhon Pathom Rajabhat University. In further research, a larger number of participants should be asked to participate to see if the results are comparable to the one presented in the current study.

4.2.2 Triangulation with qualitative methodology such as observations or in-depth interviews is needed in order get reliable results.

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