

The Development of English Braille Literacy for the Students with Visual Impairment by Using an Activity-Based Learning Method

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ABSTRACT

The objectives of this classroom research were (1) to compare the English braille literacy skill of students with visual impairment before and after using the activity-based learning method and (2) to study the classroom environment of the students with visual impairment while learning by using the activity-based learning method. Fifteen grade one students from three classes were purposively selected as a sample of this research. Instruments used in collecting data were lesson plans, English braille tests, and a classroom environment observation guideline. Descriptive statistics involving means and percentages were used to analyze reading accuracy, reading speed and writing accuracy. Then, the pre-test and the post-test scores were compared using the pair sample t-test. Results showed that the English braille literacy skill of the students with visual impairment after using the activity-based learning method was higher than before using the method. It was statistically significant at 0.05 for writing accuracy. From the classroom environment observation of the students, while learning using the activity-based learning method, it was found that all students participated in activities and had good relationships with each other and with the teacher. The students could understand the activities and lessons. The activities that the students enjoyed the most were bingo game (reading activity) and braille drawing (writing activity).

Keywords: Students with Visual Impairment / Activity-based Learning Method / Braille

1. INTRODUCTION

Literacy is an ability to read and write. Literacy aids people to understand spoken words and can translate them into writings. The United Nations Educational, Scientific and Cultural Organization defines “literacy as the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts” (UNESCO, 2004, p.13). An Indian Literacy Project (2016) shows that literacy has importance at two levels - these are a national level and an individual level. At the national level, a literate population aids society’s economics and politic to be stronger. It also aids people to have better living standards

and to work efficiently. At the individual level, literacy aids people to achieve and study everything easier. For people with visual impairment; i.e., people who are blind or have low vision, literacy is also important. Early braille education is crucial to literacy (Ryles, 1996) as braille is a fundamental tool for blind people to enable independence. Braille provides a gateway to education, employment, social, and cultural inclusion (Phillips & Beesley, 2012)

Nowadays, almost all people with visual impairment learn Braille to be literate. Every school for the blind teaches Braille to students like mainstream schools teach printed letters to sighted students. Students with visual impairment use a slate and a stylus as a tool to write embossed braille dots (Cheadle, 2007). A slate and stylus is an easy, convenient, and portable tool to write Braille like a pen of sighted people. (Blake, 2003)

At the kindergarten level in the school for the blind, students are taught to memorize all braille codes. This is to prepare them for study in an elementary level so they can use braille to read braille books and write their works. For this reason, the school for the blind that the researcher is teaching provides Braille Study subject at the elementary level in order to increase the efficiency of braille reading and writing of the students. If they could read and write braille well, they would be able to focus and follow the contents of subjects such as Thai, English and Maths, not having to worry about braille. In every period of the Braille Study subject, teachers let the whole class write and read braille together, using traditional rote learning throughout the semester. With this strategy, students with visual impairment still have problems of remembering braille codes.

Since 1981, Olson and Mangold stated that activities and games provided enrichment to the traditional braille teaching to students who are braille users in pre-school level to grade 3. Moreover, Hudson (2012), a teacher of students with visual impairments, suggested some activities for teaching braille to young children on Paths to literacy for students who are blind or visually impaired to help them have fun with lessons. Thus, the researcher considers trying a different way to teach braille. Since an activity-based learning (ABL) is a methodology that emphasizes an active learning and makes students as a center of a learning process, the researcher will use activities to teach braille in the Braille Study subject.

As the researcher is an English teacher who sees the importance of braille as a foundation for students to learn English, the researcher applied the activity-based learning method for students to practice English braille alphabets. In this way, the students with visual impairment will develop and increase their efficiency of English braille literacy.

1.1 Research Objectives

The objectives of this research are as follows:

1. To compare the English braille literacy of the students with visual impairment before and after using the activity-based learning method.
2. To study the classroom environment of the students with visual impairment while they are studying by using the activity-based learning method.

1.2 Research Hypothesis

The students with visual impairment have better English braille literacy after studying by using the activity-based learning method.

2. METHODS

2.1 Participants

A purposive sampling was used to select the sample group; i.e., fifteen students with visual impairment in grade one who could read and write braille. The reason students in grade one was selected because it was the first year in an elementary level and the students started to read and write braille in every subject. Therefore, the researcher wanted to develop their reading and writing skills to increase their learning efficiency. There were three classes in grade one (with five students in each class) - class 1/1, class 1/2 and, class 1/3. Since the number of the students were quite small and the researcher would like all of them to have the same experiences in activity-based learning, all students were included in the study.

2.2 Research Instruments

2.2.1 Lesson plans

Lesson plans used in this research to plan the context and activity that were used to teach students in a period. There were eight lesson plans (four reading lesson plans and four writing lesson plans).

The reading activities that were used in four lessons were adapted from Olson and Mangold (1981) as follows:

- The letter reading game, the students read the flashcards that consisted of the letters a – j. If they could read it, they would put it in front of them. But if they could not read it, they had to give it to the friend who sat next to them. If the friend could read that card, he or she would put the card in front of him/her. When time was up who had the largest number of cards in front was the winner.
- The bingo game, the students received a bingo card that consisted of the letter k – s. All of the letters were capitalised (had dot six in front). Then, the students picked up the card of letter k-s in the box (one letter per one card). When they picked up a card, they had to read out the letter. Who had the letter that was read on the bingo card, they had to erase dot six in front of it. If the students did not have, they did not have to do anything. The student who could erase dot six of all letters in a horizontal and a vertical roll was the winner.
- The letter matching game, Each Student had to match the letter t - z that they had on the board with the letter card in a box (one card per one letter). The student who could finish first and match correctly was the winner.
- The letter counting game, each student had to count the letters a – z that the teacher instructed on their letter sheets. For example, the teacher asked; “How many letter v

in your sheet?”. The student who could tell the amount of letter correctly would get a point and the student who got the highest point would be the winner.

The writing activities that were used in four lessons were braille drawings adapted from the book of braille drawing by Marie Porter (N.D.) “So What About Drawing? Instructions for Drawing Using A Braille Writer”. All the drawings were done using a slate and stylus as it was a tool students with visual impairment in this study were taught to use to write braille. Each drawing focused on different English braille alphabets. The students had to write the correct braille alphabets in the specific braille cell in order to get the correct drawing.

- Drawing braille picture: Flag and wrote words flag, zone, and win. In this drawing, students practiced writing letter a, e, f, g, i, l, n, o, p, w, and z.

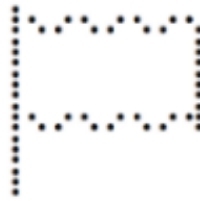


Figure 1 Flag. Adapted from *So What About Drawing? Instructions for Drawing Using a Braille Writer*, by Marie Porter, n.d.

- Drawing Braille picture: Heart and wrote the words heart love and you. In this drawing, students practiced writing letter a, e, h, i, l, o, r, s, t, u, v, and y.

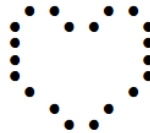


Figure 2 Heart. Adapted from *So What About Drawing? Instructions for Drawing Using a Braille Writer* by Marie Porter, n.d.

- Drawing braille picture: Spaceship and wrote the words spaceship and beam. In this drawing, students practiced writing letters a, b, c, d, e, f, h, i, m, p, q, and s.



Figure 3 Spaceship. Adapted from *So What About Drawing? Instructions for Drawing Using a Braille Writer* by Marie Porter, n.d.

- Drawing braille picture: Truck and wrote the words truck and taxi. In this drawing, students practiced writing letters a, c, e, h, i, j, k, l, p, r, s, t, u, and x.

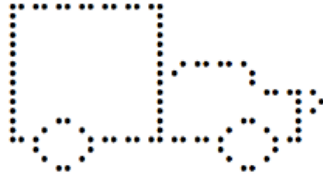


Figure 4 Truck. *Adapted from So What About Drawing? Instructions for Drawing Using a Braille Writer by Marie Porter, n.d.*

2.2.2 English braille tests

These tests included a writing test and a reading test. In the reading test, the researcher measured speed and accuracy whereas only writing accuracy was measured in the writing test. The reading test contained fifteen words (sixty-six letters). When all words were mixed, there were letter a-z in them. The students were asked to read these words one by one with the researcher by spelling out each letter in the word such as the word “acid” students had to read a-c-i-d only. They did not need to pronounce the word. If they could read all letters correctly, they got four points (one letter per one point). Then, they read the next words one by one. The time that they spent in reading (speed) was recorded after they finished the reading test. The total of the reading scores (accuracy) in the reading test were sixty-six. The writing test also contained fifteen words (sixty-four letters). When all words were mixed, there were letters a-z in them. The students were asked to write words one to fifteen consecutively by using a slate and stylus. The researcher spelled out the words and the students were asked to write all words consecutively. Points were given if they wrote letters correctly (one letter per one point). The total writing scores (accuracy) in the writing test were sixty-four.

2.2.3 Classroom environment observation guideline.

A classroom environment observation guideline was used to observe the students’ behavior while they were studying by using the activity-based learning method in these topics; i.e., participation, relationship and comprehension.

2.3 Data Collection

The process of data collection for this study was as follows:

- Proposed the IRB Submission form to the IRB Committee. Since this study was a classroom research, it was granted an exemption by the IRB.
- After received the Certificate of Exemption, the researcher used the pre-test to test the literacy skills of the sample group before teaching by using the activity-based learning method in the Braille Study period.
- The researcher taught English braille to the sample by using the activity-based learning method through the lesson plans for eight weeks. In the first

four weeks, students were taught using the reading lesson plans and followed by writing lessons in another four weeks.

- In each period, the researcher observed the classroom environment according to the classroom observation guideline while using the activity-based learning method.
- After finishing all the eight-week lessons, the researcher used the post-test to test the literacy of the sample.

2.4 Data Analysis

After the data were collected, it was organized and analyzed. For analysis of the tests, a computer program called Statistical Package for Social Sciences (SPSS) was used to analyze the pre-test and the post-test scores. Data were analyzed by using descriptive statistics. These were mean and percentage. Then, scores on reading accuracy, writing accuracy, and reading speed of the pre-test and the post-test were compared by using a pair sample t-test. For the classroom environment, the researcher analyzed and interpreted the noted data from the observation and categorized into the topics; i.e., participation, relationship and comprehension.

3. RESULTS

3.1 English braille literacy

3.1.1 Reading accuracy

The results of the reading accuracy after studying by using the activity-based learning method of all fifteen students showed that the mean of the post-test score ($\bar{x} = 61.00$, $SD = 8.78$) was higher than the pre-test score ($\bar{x} = 56.26$, $SD = 16.11$). The students improved their reading accuracy after using the activity-based learning method. However, they were not statistically significant at .05 level.

Table 1 Paired samples statistics of the pre-test and the post-test scores for the reading accuracy of all students

	Mean (\bar{x})	Number of students	Standard Deviation	Sig. (2-tailed)
The pre-test reading	56.26	15	16.11	0.72
The post-test reading	61.00	15	8.78	

3.1.2 Reading speed

For the reading speed, a comparison of the means of reading time spent before and after using the activity-based learning method of all fifteen students showed the post-test time spent ($\bar{x} = 3.73$, $SD = 3.32$) was less than the pre-test time spent ($\bar{x} = 4.87$, $SD = 4.56$). However, they were not statistically significant at .05 level.

Table 2 Paired sample statistics of time spent (the reading speed) in the pre-test and the post-test in the reading of all students

	Mean (\bar{x})	Number of students	Standard Deviation	Sig. (2-tailed)
The pre-test time spent	4.87	15	4.56	0.239
The post-test time spent	3.73	15	3.32	

3.1.3 Writing accuracy

For the writing accuracy, the results of the writing accuracy after studying by using the activity-based learning method of all fifteen students showed that the mean of the post-test score ($\bar{x} = 58.07$, $SD = 10.22$) was higher than the pre-test score ($\bar{x} = 53.73$, $SD = 14.81$). Moreover, the result showed the statistically significant at <0.05 level.

Table 3 Paired samples statistics of the pre-test and the post-test scores for the writing accuracy of all students

	Mean (\bar{x})	Number of students	Standard Deviation (sd.)	Sig. (2-tailed)
The pre-test writing	53.73	15	14.81	*0.019
The post-test writing	58.07	15	10.22	

Note. * Significant level at <0.05 .

3.2 Classroom environment

While the researcher was teaching by using the activity-based learning method in each topic, the researcher also used the classroom environment observation guideline to observe the students in the following areas; participation, relationship and comprehension.

3.2.1 Participation

This topic was separated into participation in activities and interest in the activities.

For the participation of the students in the activities, all students participated in the activities. They paid attention and did the activities. They did all activities from the beginning to the end. No one refused to do the activities. They smiled and said that they wanted to do the activities rather than studying by writing and reading in the traditional way. When they knew that they would ask to play a game today, they shouted “Yeah!” loudly and clapped their hands.

For the Interest of the students in the activities, in the letter finding game, a few students in class 1/2, and 1/3 were bored. They said that they knew and could read letters but they had to wait for their friends who read slower than them. All of the students in class 1/1 could read the letters already and they did the activity without any excitement and usually said “this game is very easy”. In the end, all students had the same points and all of them were winners. In class 1/2, there was one student who read braille quite slowly and was always confused between letters u and y, He always said that he was a loser he showed boredom on his face and did not enjoy the activity. While the others could read fast and got the same points. They said that the game was very easy.

They could do it. So, the environment was not exciting. In class 1/3. There was only one student who could read fast but the others spent a lot of time reading in one letter. Two students had a problem in reading. One of them could not read and another one could read very slowly and had a short time concentration. She always said she could not read and she looked very stress when she read. Therefore, this classroom environment was very serious and without any fun. Most of them spent too much time per card. They touched letters, tried to read, and did not say anything while the next students were bored waiting for their turns. The activity usually stuck with one student and could not continue the game. If the researcher did not wait for them, a card would be passed to the only one student who could read quickly and others would not get any points. Therefore, the researcher had to adapt the rule of the activity to help them practice their reading skill. The researcher gave them a card and told them to raise their hands when they were ready to read. If they could read it correctly, they would get one point and could pick another card to read again. At the end of the class who got the highest points was the winner.

For the bingo game, all students enjoyed it very much. The environment was very fun and cheerful. They were very happy when they had the letter and usually asked their friends whether they had the same letter or not. At the end of the class, all of the students asked to play again in the next period. Although students in class 1/3 spent a long time reading, they tried and the researcher helped them to check the letter before they erased dot six.

For the letter matching game, all students were interested in this activity. They did and had fun when they found a card in a box. They smiled and laughed. In class 1/3, it was quite difficult for most students because a card was in a box and they rotated cards incorrectly and spent a longer time to find the correct way and read. However, they were happy and said “Yeah” when they found the letters in the box. They always asked their friends that how many letters their friends could match, and tried to find letters even they used a long time. They would keep on to match to be the winner.

For the letters counting game, the students in class 1/1 and 1/2 had fun with this activity. They competed with their friends and smiled together. However, this activity was quite difficult for a few students in class 1/3 because there were so many letters in a paper and they read them very slowly. Therefore, they lost their concentration and were bored. A few students said that they did not want to count and read again. There were only three students who tried to count and enjoyed this activity.

In sum, results showed that for those students who were fluent in reading English braille letters, the activity of reading letter by letter like the letters reading game made them bored. On the contrary, those students who still could not recognize letters very well found the activity that they had to read a lot of letters on one piece of paper quite stressful for them.

For the writing activity, the students loved Braille drawing very much. They had a concentration when they drew. They tried and asked to draw again if they had a mistake. After class, they showed their pictures and tried to write again by themselves. A few students in three classes created their own pictures when finished the activity. They created new pictures by mixing the heart flag and the truck in one picture and colored them for fun. For writing word competition

in each picture, they liked this activity too. They enjoyed writing and always asked their friend that how many rows they wrote. When they wrote incorrectly, they said they had to do better in the next time.

3.2.2 Relationship

This topic was separated into relationships between the students and the teacher, and between students and students. For the relationship between the students and the teacher, all students had a good relationship with the teacher. That was noticed from the action of students. They were friendly with the teacher. They asked the teacher when they had questions, asked for help when they had problems, and expressed their feeling while they did the activities. For example, they expressed that they wanted to do it again when they liked the activity. They also told the teacher that they could not read and they did not want to do it anymore. When the teacher came into a class, the students always asked about what game they would play in this period and asked for their favorite game such as the bingo game and the braille drawing.

For the relationship between students and students, they were friendly with one another. They smiled and talked about the activities while they did it. They always asked their friends' scores when they did the activities. In addition, they helped their friends when they were confused. For instance, when a few students forgot some letters, they asked braille dots to check and their friends would indicate the correct dots.

3.2.3 Comprehension

Comprehension in activities and lessons, students understood the activities and the lessons. They could do the activities after the teacher explained how to do them. However, in the bingo game, they spent a lot of time to understand. They were confused about how to erase dot 6 and how to get bingo. They did not know that they bingo or not. Therefore, they spent time too much to understand and had less time to play.

4. DISCUSSION

In this section, the results will be discussed. English Braille literacy in this study refers to reading accuracy, reading speed, and writing accuracy. Although only the result of writing accuracy was significantly improved at .05 level, all means of the post-test scores were higher than the pre-test scores. As Hudson (2012) said Braille activity was a good way to teach braille to young braille learners, other researchers also considered similarly with learners without disability. Studies were also conducted using activities and games in different subjects. Festus (2013) studied the activity-based learning method in the mathematic class while Roekmuang (2009) used vocabulary games to teach English vocabularies to primary students. Results were similar with the findings in this study that the students enjoyed the lesson more than studying in the traditional way and that the students could develop their skillss better. Allowing students to actively participate in the activities rather than having them sit passively listen to what teachers told them would lead to students being able to retain what they learned more sustainably (Festus, 2013; Okawuishu, 2011). These results supported the expression of Lillard (2013) that play is the work of the child. The classroom environment was also important because a good environment; i.e., physical elements

(e.g. resources, wall art, and arrangement of desk) and intangible elements (e.g. energy of the classroom, the rules and happiness) in the classroom could impact students' achievement (Hannah, 2013). It was a positive reinforcement that supported the learning behavior of students and could increase their learning retention. (Chularut, 2005). Furthermore, it also supported students to have a good relationship between one another and it could increase an inspiration to study in the classroom (Limbu, 2012). Therefore, choosing appropriate activities for students was so important. The observations showed that some activities were appropriate for students in some groups and some activities were appropriate for students in every group. Letter reading game was not appropriate for students who could read Braille well because they could read well already. This letter reading game depended on reading accuracy only. It did not have a time limit to judge the winner, so it did not challenge them. On the other hand, a few students who could not read well were frustrated in letter counting game because they spent a very long time decoding. When they had to read a lot and count at the same time, they were discouraged and did not have fun with this activity. For other activities, especially the bingo game and braille drawings could be enjoyed by all students. They were a good choice to be used to develop students' literacy.

Braille drawing was a new activity for students with visual impairment in this study. Most of them could not draw like sighted people but they also wanted to draw. According to Rex, Koenig, Wormsley & Baker (1994), the purposefulness of writing was important because it could encourage students to write. Gadd, Berthen & Lundgren (2021) also stated that the setting of writing purpose could make students became better writers. In this activity, the purpose was a picture. The students tried to write correctly and even practiced outside the class in order to get a perfect picture.

The result of the classroom environment observations showed that most of the students requested to draw a new picture in every period. It supported the fact that having a good attitude with things they learned could increase the efficiency of good memory. (Reilly & Ward 1997) In addition, students who had a positive attitude in the lesson was more diligent and this led to students' achievement (Maharaj-Sharma & Sharma, 2017). The students always showed the pictures that they drew in their free time to the teacher. This indicated that students had fun with the activities and practiced more. Students who practiced more could develop more (Pattillo, Heller & Smith, 2004). These could be the reason for the writing accuracy scores that was improved most.

For Bingo game, it was a fun game that students could enjoy together. This game did not depend on reading skills only but also depend on their luck. Therefore students who could read well were not always the winner. Everyone could be the winner. Thus, all students had the encouragement to participate in the activity. Puspita and Losari (2016) studied the influence of the bingo game on students' vocabularies. The result showed that there is a significant influence of using the bingo game on students' mastery of the vocabularies. Furthermore, the bingo game did not require many materials, so the students could make bingo cards by themselves and play with their friends outside the classroom.

The findings showed the implication that the activity-based learning method was a good way to develop braille literacy. Consequently, teachers should try to use other new activities to develop students' literacy rather than just let students to memorize braille dots only.

Since this study focused on the use of activity-based learning method with basic uncontracted braille (one braille sign equal one English print letter), the future research may consider to expand the study to contracted braille (one braille sign equals one print word). The contracted braille may be useful to the students because it can help students to read and write faster and many books in higher grades are in contracted braille.

5. CONCLUSIONS

In conclusion, students with visual impairment have better English braille literacy after studying by using the activity-based learning method. The writing accuracy was improved the most. Furthermore, the bingo game and the braille drawing were the activities that students enjoyed more than the other activities and every student who could read and write braille could do these activities together. In addition, these activities were easy to prepare and they could play by themselves. The students could play when they have free time and they could practice braille writing and reading outside the classroom. In this way, students had more fun practicing braille reading and writing skills than they used to in the traditional rote learning.

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