The Effect of PQ4R and Mind Mapping to Students' Reading Comprehension

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ABSTRACT

The study aims at proving the effectiveness of the PQ4R and Mind-Mapping strategies in helping students to achieve higher reading comprehension score. The study involved two groups of Electrical Engineering department of UMM which were drawn using random sampling technique. The experimental group was taught using PQ4R (Preview, Question, Read, Reflect, Recite, Review) and Mind-Mapping strategies meanwhile the control group was taught using Direct Reading Activity (DRA) strategy. it was proven that PQ4R and Mind-Mapping strategies were more effective in helping students achieve higher literal comprehension score in reading since the different marginal means of post-test between control and experimental groups was 33.67 and the students were trained to be more active learners.

Keywords: PQ4R, Mind-Mapping, effectiveness, literal and inferential comprehension

INTRODUCTION

Reading is one of the language skills that plays an important role in people's life. It is because reading gives foundation for children's future learning[42]. That means the people's life and reading is interrelated. In addition, reading can be defined in many ways by many reading experts. First, reading is defined as a highly complex act which includes two major components – a process and a product. The product of the reading act is defined as communication, while the reading process involves reader's interest and attitude.

Reading is a complex process since it involves two main aspects: linguistics competence and background knowledge. The processing of linguistics information becomes central to reading comprehension and it is clear that background knowledge and reasoning as foundation of reading[43]. It means that the act of reading is triggered by the graph phonic information such as letters, syllables, and word order to derive meaning from the print. To

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[42] Belk, R.W. 2000.The why of consumption: contemporary perspectives on consumer motives, goals, and desires. London and New York: Routledge.

[43] Grabe, W. 2009. *Reading in a Second Language*. Cambridge: Cambridge University Press.

get the content and foundation of the text when reading, there are three factors influencing comprehension: reader, text, and activity[44].

Considering materials for use in reading comprehension needed to be known by teacher, there are four levels of reading comprehension. There are four different types of reading comprehension: 1) Literal comprehension: reading in order to understand, remember, or recall the information explicitly contained in a passage such as identifying the main ideas, supporting ideas, details, vocabulary meaning, cause effect relationships, similarities, and comparability of language stated in the text. 2) Inferential comprehension: reading in order to find information which is not explicitly stated in a passage, using the reader's experience and intuition, and by inferring. 3) Critical or evaluative comprehension: reading in order to compare information in a passage with the reader's own knowledge and values. 4) Appreciative comprehension: reading in order to gain an emotional or other kind of valued response from a passage. In summary, reading comprehension is the process or practice of making meaning from text to involve readers emotion, believes, and through resulting not only from the readers, individuals characteristics but also his/her experiences

Related to this study as well as the curriculum, the reading comprehension is focused on the literal comprehension and inferential comprehension levels. It is suitable to the objective of reading at the syllabus of English for Specific Purposes (ESP) of reading class in Muhammadiyah University of Malang which is in pre-intermediate level. Besides, the lecturer often asks a student or two in the class to read the text or the lecturer reads the text his/herself, translates word by word or sentence by sentence prior to having students answer the questions in the text. This kind of reading comprehension strategy is known as conventional strategy or Direct Reading Activity (DRA) strategy.

Direct Reading Activity (DRA) strategy tends to be teacher-centered[45]. DRA has five steps[46], namely, (1) preparation for reading is done by checking students' previous learning and past experiences to the topic of the passage and teaching key words that carry the concept; (2) Purpose for reading is done by providing guidance in how and why to read a specific selection; (3) silent reading is done by asking the students to read the passage silently; (4) follow-up activities are done by having a class discussion so that the students have

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[44] Snow, C. E. 2002. Reading for understanding: *Toward a Research and Development Program in Reading Comprehension*. Santa Monica: RAND.

[45] Daines, D. 1982. Reading in the Content Areas: *Strategies for Teachers*. Illinois: scott, Foresman and Company.

[46] Ibid

opportunity to clarify and extend ideas upon the passage; (5) expansion activities are done to extend the students understanding by doing individual or group project.

Based on the researcher's observation, this strategy is also applied by many lecturers in teaching ESP Reading in Muhammadiyah University of Malang. Then, based on the questionnaire administered to 46 ESP lecturers in Language Center of UMM, around 96% lecturers stated that Direct Reading Activity (DRA) strategy is not effective for teaching of reading skill. They preferred to employ strategy which gave students bigger portion in class or student-centered learning strategy.

Moreover, the teaching strategy that provides students' big opportunity to students to be student-centered learner in understanding the text is a strategy that was developed by Thomas and Robinson[47]. The strategy is called as PQ4R (Preview, Question, Read, Reflect, Recite, and Review)[48]. The PQ4R is one of branch of elaboration strategy. This is used to help students to remember what they have read and help teacher in the process of teaching and learning in class at the time reading the book.

PQ4R is a method that encourages students to create questions and answer that pull readers of the text to dig and understand the text deeper[49]. PQ4R method should help the student comprehend better, concentrate better, and retain better[50]. The steps of PQ4R which were proposed by Tritanto consist of six: previewing the text, creating questions that appeared in mind after preview, reading the text, reflecting the information in text with the fact or background knowledge, reciting what have been understood to partner, and reviewing information which was noted and understood[51].

During "Read" step in PQ4R strategy students also need to take note on the important things of the text they are reading[52]. However, several studies indicate that most of students' note-taking technique is not effective enough to help the students get broader understanding of a certain reading text. The common uses of note taking is linear style. A

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[47]Thomas, E. L, & Robinson, H. A. 1972. *Improving reading in every class: A Sourcebook for teachers.* Boston: Allyn and Bacon

[49] Alderson, J.C. 2000. *Assessing Reading.* Cambridge: Cambridge University Press.
[50] Sanacore, J. 2000. *Transferring the PQ4R Study procedure.* The Clearing House,55(5) pp. 234-236.
[51] Trianto. 2007. *Model-Model Pembelajaran Inovatif Berorientasi Konstruktivistik.* Jakarta : Prestasi Pustaka.
[52] Ibid.

linear style note-taking is a style in taking notes where sentences follow a fixed sequence.

In this study, the researcher focuses on asking students to use mind-map strategy only as note-taking technique to organize ideas. A Mind-Map is a powerful graphic technique which provides a universal key to unlock the potential of the brain[54]. It harnesses the full range of cortical skills – word, image, number, logic, rhythm, color and spatial awareness – in a single, uniquely powerful manner. In doing so, it gives you the freedom to roam the infinite expanses of your brain. Hence, in correlation of the benefits of those two strategies, researcher would like to investigate the effectiveness of PQ4R and Mind-mapping strategies to teach reading skill focusing on literal and inferential meaning understanding for second semester of Electrical Engineering students in Muhammadiyah University of Malang while they are usually taught ESP Reading using DRA strategy.

RESEARCH METHOD

The present study was aimed at investigating the effect of PQ4R and Mind-Mapping strategies to the experimental group on students' reading comprehension ability in finding the literal meaning and inferential meaning in the text which is compared to the control group utilizing the conventional teaching strategy (Direct Reading Activity strategy). A scientific investigation in which the researcher manipulates one or more independent variables, controls any other relevant variables, and observers the effect of the manipulations on the dependent variables is experimental research[55].

To explain the research objective formulated in the previous section, the study adopted a quasi-experimental design non-randomized controlled group pretest-posttest design. Nonrandomized groups here are already existed classes. Pretest and posttest helped in determining whether any difference exists or not[56]. This is to see whether the treatment has an impact on the students displayed by comparing the result of the pretest and post-test.

There were two research variables involved in this study, namely independent variable and dependent variable. Independent variable was the experimental treatment or the

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[53] Makany, T., Kemp, J. and Dror, I. E. 2009. Optimizing the Use of Note-Taking as an External Cognitive Aid for Increasing Learning. *British Journal of Educational Technology (pp. 1-20)*

[54] Buzan, T. 2009. *Buku Pintar Mind Map.* Jakarta: PT. Gramedia Pustaka Utama.

[55] Ary, D, Jacobs, L.C, Razaveih, A, and Sorensen, C. 2006. *Introduction to Research Education (the d,).* Belmont, California: Thomas Higher Education.

[56] Ary, D, Jacobs, L.C, Razaveih, A, and Sorensen, C. 2006. *Introduction to Research Education (the d,).* Belmont, California: Thomas Higher Education.

manipulated variable, in this case the PQ4R and Mind-Mapping strategies. Dependent variable was the observed and measured variable, in this case students' reading comprehension achievement (score). Knowing the variables, it was expected that it would be seen whether or not the independent variable influenced the dependent variables.

Notice that pretest was considered as covariate. By definition "covariates are quantitative variables that are related to the dependent variable."[57] The pretest scores, as they represent students' ability in the beginning of the research, were considered to interference the statistical calculation which in turn affects the result of the calculation of the result of posttest. See table 1 for the variables of the study.

Table 1 The Non-randomized Control Group Pretest-Posttest Design

Group	Pretest	Treatment	Posttest
A	Y1	X	Y2
B	Y1	-	Y2

Adapted from Ary, et. al. (2006:341)

Notes:

A : refers to experimental group which is taught by PQ4R and Mind-mapping strategies

B : refers to the control group which is taught by conventional strategy (Direct Reading Activity strategy)

Y1 : refers to the pretest in the form of reading comprehension test

X : refers to the treatment given to the experimental group in the form of PQ4R and Mind-mapping strategies

\- : refers to the using of conventional teaching for the control group that is the conventional strategy (called Direct-Reading Activity strategy)

Y2 : refers to the posttest in the form of reading comprehension test

To make the research design clearer, the features of the design of the study used are presented below:

a. the experiment was conducted in classroom setting in which the classes have been set up into class A, B, C, D and E. only two out of five classes were involved in the

[57] Ary, D, Jacobs, L.C, Razaveih, A, and Sorensen, C. 2006. *Introduction to Research Education (the d,).* Belmont, California: Thomas Higher Education.

experiment: one class was as the experimental group (Class B) and the other class

b. to measure students' reading comprehension as dependent variable, before and after the experiment pretest and posttest were administered to test the effectiveness of PQ4R and Mind-Mapping strategies as independent variables.

c. Pretest and posttest were administered to both group with the same test

d. Instructional materials in experimental group used PQ4R and Mind-Mapping strategies. However, instructional materials in control group did not use PQ4R and Mind-Mapping strategies but Direct Reading Activity (DRA).

FINDINGS AND DISCUSSION

In this discussion, the interpretations of research finding are divided into two points of view; statistical and practical view. From the statistical point of view, the finding of the research showed that the students taught using PQ4R and Mind-Mapping strategies showed significant higher reading comprehension achievement than those taught using conventional strategy (DRA strategy). It is shown from the significant value, which is lower than 0.05, F = 37.322, P = 0.000 < 0.05. Furthermore, it could be seen from the differences between the adjusted means for two groups, which were reported in the Estimated Marginal Means table as 73.62 for the students taught using PQ4R and Mind-Mapping strategies, and 47.43 for the students taught using DRA strategy. The mean score of the experimental group improved 38.76, while the mean score of the control group improved 6.29. Therefore, the experimental and control groups were significantly different and the result of analysis rejected the null hypothesis saying that both strategies (PQ4R with Mind-Mapping and DRA strategies) were equal. It means that the theoretical hypothesis was supported with empirical evidence.

Furthermore, in more specific ways as match with the objective of this study, the statistical calculation on the students' literal and inferential comprehension scores in both experimental and control group can be interpreted as follows:

First, the statistical calculation on students' literal comprehension in control group showed marginal mean increasing. Since, the students' pretest score in control group on literal comprehension mean was 38.33. On the other hand, in the post-test of control group, the mean was 44.04. The mean increased 5.71. While in the experimental group, the literal comprehension marginal mean score in pre-test was 39.76 and in post-test was 79.05. The means increased 39.38. The increasing mean of control group was lower that the increasing

mean of experimental group (5.71 < 39.38). Those statistical calculations proved that the students who were taught using PQ4R and Mind-Mapping strategies performed better in literal comprehension that those taught using conventional strategy (DRA strategy).

Moreover, the comparison on the highest scores for both experimental and control groups in post-test is also supporting that PQ4R and Mind-Mapping strategies helped students to achieve better score in literal comprehension. Since, the highest score in control group was 58.33 and the highest score in experimental group was 91.67.

Second, the statistical calculation on students' inferential comprehension in control group showed marginal mean increasing. Since, the students' pretest score in control group on inferential comprehension mean was 43.02. On the other hand, in the post-test of control group, the mean was 49.68. The mean increased 6.66. While in the experimental group, the literal comprehension marginal mean score in pre-test was 44.12 and in post-test was 70.00. The means increased 25.88. The increasing mean of control group was lower that the increasing mean of experimental group (6.66 < 25.88). Those statistical calculations proved that the students who were taught using PQ4R and Mind-Mapping strategies performed better in inferential comprehension that those taught using conventional strategy (DRA strategy). In addition, the comparison on the highest scores for both experimental and control groups in post-test is also supporting that PQ4R and Mind-Mapping strategies helped students to achieve better score in literal comprehension. Since, the highest score in control group was 66.67 and the highest score in experimental group was 88.89.

In addition, based on the statistical calculation on the different means of both literal and inferential comprehension, it was quite surprising that different mean in inferential comprehension (25.88 – 6.66 = 19.22) was lower than the different mean in literal comprehension (39.38 - 5.71 = 33.67). This fact explained that, in this study, the PQ4R and Mind-Mapping strategies performed better to improve students' literal comprehension scores than to improve students' inferential comprehension scores. It Mei be caused by: First, the strategy was too rigid and almost overwhelmed the students. Second, the students mostly created literal questions instead of inferential questions. It was because creating inferential questions required higher-level of thinking. Third, the text selected for the instructional materials were too difficult for students that it would discourage students' motivation. Nevertheless, the statistical calculations on students' literal and inferential comprehension supported the theoretical hypothesis.

From the practical view, the research finding indicated that PQ4R and Mind-Mapping strategies can contribute to the improvement of students' reading comprehension skill. This was probably because of some reasons.

Firstly, the implementation of the Mind-Mapping strategy in the "read" step of PQ4R strategy helped students to organize the information they got from the reading material in an effective way. Mind map is a great rote map for the brain in order to arrange facts and ideas in which our brain is involved naturally[58]. By training students to find keywords of each paragraph to be put in their mind-map provided the opportunities for students to recall the detail information from the reading material. Also, a mind-map or concept-map[59] (Stewart, Vankrik & Rowell, 1979) is an excellent device that visually represents the hierarchical relationship between concepts within the structure or segment of a discipline. It means by linking the detail information they have taken from the reading materials in the form of mind-map line or tentacles made them easier to connect the information to get the whole understanding of the reading material or the reading material became simpler in mind-map.

Secondly, the accessibility for students to draw their favorite shape of mind-map made them enjoy the reading process which possibly reduces their learning anxiety. In creating Mind-map the note taker will work with his right brain which relates to graphic, color, and kinesthetic works that will encourage joyful note-taking circumstance[60].

Thirdly, the implementation of the PQ4R and Mind-Mapping strategies prevented the students' boredom as they never experienced before. The students' enthusiasm and motivation in the experimental group was increased or at least remained. Reader's motivation and interest influence the reading comprehension. This is based on the students' punctuality in finishing the learning procedure of PQ4R and Mind-Mapping strategy[61].

Fourthly, the PQ4R strategy leads students in experimental group to be an interactive reader since the employed top-down and bottom-up reading processes. Students did not only put the understanding of the text only from reading the printed materials but also to activate

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[58] Buzan, T. 2009. *Buku Pintar Mind Map*. Jakarta: PT. Gramedia Pustaka Utama.

[59] Stewart, J., Vankrik, J., & Rowell, R. (1979) Concept Map: A Tool for Use in Biology Teaching. *America Biology Teacher*, 41(3), 171-175

[60] Buzan, T. 2009. *Buku Pintar Mind Map*. Jakarta: PT. Gramedia Pustaka Utama.

[61] Snow, C. E. 2002. Reading for understanding : *Toward a research and development program in reading comprehension*. RAND, Santa Monica

their background knowledge to negotiate to get the whole comprehension of the reading materials. It happened in all steps of PQ4R strategy[62].

First, in "Preview" step, students grab the title of the text and try to get the literal meaning and they try to connect the literal meaning with the pictures around the text and information they know. This stage gives students a bird's-eye view of what they are reading[63]. Preview step gives a picture about the upcoming text that students will read[64].

Second, "Question" step leads students to catch word or phrase or any printed material in the reading material which they will connect to their previous knowledge to raise questions. In raising the questions that they preview, they seemingly wanted to check their uncertainty and to find out what they did not know during reading. Students draw on prior knowledge in a narrower, more specific fashion[65].

Third, in "Read" step, it is absolutely students did interactive reading to help them to comprehend the text and to create images or symbols which are matched for drawing mind-map. Interactive reading theory is a combination of two types of processing – top-down (reader based) and bottom-up (text based) – in continuous interaction. Thus, the reader's background knowledge is used to negotiate the printed materials meaning[66].

Fourth, the "Reflect" steps brought them to go back to their real life experience and knowledge while their classmates explanations were relevant to the text or not, and appropriate to complete their mind-map as note.

Fifth, the "Recite" step or explaining to classmates, it made students to activate their auditory memory by talking about what they had read[67]. It created double memorizing process rather than students in control group that read the reading material in silent way which might make them sleepy. Also, some students who were more auditory in learning were helped a lot by listening to their classmates to understand and memorizing the content

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[62] Brown, H.D. 2004. Language Assessment; *Principles and Classroom Practices*. New York: Pearson Education.

[63] Langan, John. 2002. *Reading and Study Skill. Seventh Edition*. United States: Mc Graw Hill

[64] Vacca, R. T., and Vacca, J. L. 2005. Content Area Reading: *Literacy and Learning Across the Curriculum*. Boston: Pearson Education.

[65] Herber, H. L. and Herber, J. N. 1993. *Teaching Content Areas with Reading, Writing, and Reasoning*. Boston: Allyn and Bacon.

[66] Brown, H.D. 2004. Language Assessment; *Principles and Classroom Practices*. New York: Pearson Education.

[67] Trianto. 2007. *Model-Model Pembelajaran Inovatif Berorientasi Konstruktivistik*. Jakarta : Prestasi Pustaka.

of reading material. When students are encouraged to verbalize their ideas, cognitive development is supported[68].

The last step, "Review", made students analyze the texts whether they modify their prior knowledge, strengthen their prior information, or change their prior belief. So, students applied both reading their notes and matching them with prior knowledge.

CONCLUSION

Based on the research problem and the result of data analysis, it can be concluded statistically that students who were taught using PQ4R and Mind-Mapping strategies showed significant higher literal and inferential reading comprehension achievement than those taught using conventional strategy (DRA strategy) with significant value = 0.00 < 0.05. To be more detailed, it was proven that PQ4R and Mind-Mapping strategies were more effective in helping students achieve higher literal comprehension score in reading since the different marginal means of post-test between control and experimental groups was 33.67 and the students were trained to be more active learners.

However, PQ4R and Mind-Mapping strategies were effective in helping students to achieve higher inferential comprehension although not more effective than if those were used to comprehend literal meaning. Since, the different marginal means of post-test between control and experimental groups was 19.22. It Mei be caused by three reasons:

1. the strategy was too rigid and almost overwhelmed the students.
2. the students mostly created literal questions instead of inferential questions. It was because creating inferential questions required higher-level of thinking.
3. the text selected for the instructional materials were too difficult for students that it would discourage students' motivation.

Moreover, PQ4R strategy contributes more to help students to achieve higher reading comprehension since they worked more with text to fulfill the PQ4R strategy checklist which consisted of six steps than mind-mapping that only in "Read" step of PQ4R strategy.

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[68] Braunger, J., and Lewis, J. P. 2006. *Building a Knowledge Base in Reading.* USA: IRA & NCTE

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