



Faculty of Cognitive Sciences and Human Development

**An Investigation of Metacognitive Scaffolding and Strategy use in
Reading Comprehension among the Engineering Students**

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An Investigation of Metacognitive Scaffolding and Strategy use in Reading
Comprehension among the Engineering Students

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DECLARATION

I hereby declare that the work in this thesis was carried out in accordance with the regulations of University Malaysia Sarawak. It is original piece of work based on the results of my own data whereas; the others' work is clearly either indicated or acknowledged in citations and in references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Lastly, I hope my contribution would be useful for my employer, my students, and my country to develop and design new syllabus and curriculum in order to enhance reading comprehension using metacognition.

DEDICATION

I dedicate my work to my dearest father Shahnawaz Channa (Late) and my mother for her endless love, prayer, and care.

ABSTRACT

This thesis reports the results of the research conducted to explore whether students learn reading comprehension more successfully using the different approaches based on metacognitive strategies in reading texts. The study was conducted at QUEST, in Pakistan and the respondents were selected from four engineering departments. Data was collected through qualitative instruments using semi-structured interviews with teacher respondents, focus group interviews with student respondents, and class room observations. This study was undertaken into two phases. In the first phase of study, a preliminary study using semi-structured interviews was undertaken to check the reliability of the tools. Similarly, the actual study used semi-structured interviews of 10 teacher respondents, 8 focus group interviews of engineering students; each group consisted of 5 students, and 12 class observations. Data of this research study was organized by using NVivo software version 08 and data was analyzed by following Strauss and Corbin (1998) to determine the metacognitive scaffolding and strategy use in reading comprehension among engineering students. After reading through each interview, data was transcribed based on content analysis using open coding. Therefore, each interview into sections was colour-coded and codes were identified; in results, sixteen themes were emerged in the data. These themes were interpreted separately. The findings and results of study research in line of interview with teacher respondents revealed that the students used several strategies that include vocabulary difficulties, long complex sentences with complex structure, and grammar structure in the texts. Further, the findings from teacher interviews also revealed that most students lacked background information and failed in recalling their background experiences or prior knowledge when they read passages. The semi structured interview revealed that

teachers used teachers' support to develop students' reading comprehension. Similarly, the results from focus group interview showed that the students used scanning, skimming, thinking through images, and questioning as planning; rereading, selecting main ideas, selecting topic sentences, guessing strategy, selecting unfamiliar words and phrases, using past experiences, and using dictionary as monitoring; however, summarizing and paraphrasing were used as evaluating strategies. However, the results revealed that these students used peer support for developing reading comprehension. Conversely, some students could not complete their reading tasks in time as they failed to make correct guesses of the texts and could not identify the exact meaning of the texts. Moreover, the findings of classroom observations verified the results of the study based on both teacher respondents' interview and student respondents' group interview and confirmed that metacognitive scaffolding and strategy use can improve the reading comprehension of engineering students.

Keywords: metacognitive strategies, reading comprehension, reading barriers, scaffolding

***Suatu Kajian Perancah dan Strategi Metakognitif dalam Kefahaman Membaca
Pelajar Kejuruteraan***

ABSTRAK

Tesis ini melaporkan mengenai hasil kajian yang dijalankan untuk mengkaji sama ada pelajar yang mempelajari kefahaman membaca lebih berjaya menggunakan pendekatan yang berbeza berdasarkan strategi metakognitif di dalam teks bacaan. Kajian ini telah di lakukan di QUEST Pakistan dan informan telah di pilih dari empat jabatan kejuruteraan. Data telah diperolehi melalui instrument kualitatif menggunakan temubual separa struktur dengan responden yang terdiri dari guru. Temubual secara kumpulan berfokus pula dijalankan dengan responden dari pihak pelajar dan juga melalui pemerhatian dalam kelas. Kajian ini telah di bahagikan kepada dua fasa. Di dalam fasa yang pertama kajian, kajian awalan menggunakan temubual separa struktur telah di lakukan untuk mengkaji kebolehpercayaan soalan. Setelah itu, di dalam kajian yang sebenar menggunakan temubual setengah struktur kepada 10 cikgu yang menjadi responden, 8 orang melalui temubual kumpulan berfokus adalah dari pelajar kejuruteraan, setiap kumpulan mengandungi 5 pelajar dan 12 kelas pemerhatian. Data dari kajian ini telah di gunakan menggunakan perisian NVivo versi 08 dan data telah di analisa menggunakan Strauss dan Corbin (1998) untuk menentukan perancah metakognitif dan strategi yang di gunakan dalam kefahaman membaca di kalangan pelajar kejuruteraan. Setelah meneliti data temubual. Ianya telah di transkrip berdasar analisa isi menggunakan kod yang terbuka. Untuk itu, satu temubual dalam seksyen adalah kod berwarna dank od telah dikenalpasti, dan hasilnya enam belas tema dikenalpasti dari data ini. Data ini telah di di interpretasi secara berasingan. Dapatan dan hasil kajian temubual dengan guru menunjukkan pelajar telah menggunakan beberapa strategi termasukperkataan yang sukar, ayat yang panjang dan kompleks

dengan struktur yang kompleks, dan struktur tatabahasa didalam teks. Selanjutnya dapatan dari temubual guru juga menunjukkan bahawa kebanyakan pelajar kekurangan maklumat latar belakang dan gagal dalam mengingati pengalaman latar belakang apabila mereka membaca rangkap. Soalan separuh struktur juga menunjukkan bahawa guru menggunakan sokongan rakan sebaya untuk membina kefahaman membaca pelajar. Pada waktu yang sama, keputusan dari temubual kumpulan berfokus juga menunjukkan bahawa pelajar menggunakan imbasan, skim, memikir melalui imej dan menyoal seperti yang di rancang, membaca kembali, memilih idea utama, memilih tajuk ayat, strategi meneka, memilih perkataan dan frasa yang tidak biasa, menggunakan pengalaman lalu, dan menggunakan kamus sebagai alat memerhati, namun mereka meringkaskan dan mengadakan perenggan semula telah digunakan sebagai strategi untuk menilai. Bagaimanapun hasil dapatan menunjukkan pelajar telah menggunakan bantuan rakan sebaya untuk membina kefahaman membaca. Sebaliknya, kebanyakan pelajar tidak dapat menghabiskan arahan membaca di dalam masa yang ditetapkan kerana mereka gagal untuk meneka dengan betul tentang teks dan tidak dapat mengenal pasti makna sebenar teks tersebut. Selanjutnya, dapatan dari pemerhatian kelas telah mengesahkan dapatan dari kajian berdasarkan temubual guru dan kumpulan pelajar dan juga mengesahkan perancah metakognitif dan strategi yang digunakan boleh meningkatkan kefahaman membaca pelajar kejuruteraan.

Kata kunci: *strategi metakognitif, kefahaman bacaan, halangan bacaan, perancah.*

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LIST OF ABBREVIATIONS

| | |
|-------|---|
| ZPD | Zone of Proximal Development |
| ST | Socio-cultural Theory |
| BISE | Board of Intermediate and Secondary Education |
| QUEST | Quaid-e-Awam University of Engineering, Science, and Technology |

CHAPTER 1

INTRODUCTION

1.0 Overview

This research was aimed to investigate metacognitive scaffolding and strategy use in reading comprehension among the engineering students. The research transferred from getting overall familiarity about how students learned and believed about text perception to the metacognitive strategies particularly for reading comprehension in the English language. This chapter describes the background of the research including educational system in Pakistan and statement of problems. The research objectives followed by research questions are also presented. The significance of this study is delineated followed by the novelty of study. The thesis structure and the glossary of the terms are described in the end of the chapter.

Metacognition is defined as the knowledge and regulation of students' learning processes (Flavell, 1979). Metacognitive knowledge denotes about the present knowledge of students based on their own cognitive processes; whereas, Metacognitive regulation indicates about the strategies used to supervise their own learning (Flavell, 1979). According to Grotzer and Mittlefehldt (2012) metacognitive knowledge and metacognitive regulation are known as the most essential components used in the activities for study in reading comprehension and problem solving. Chi et al. (1989) found the benefits of metacognition for learning and informed that students, who used metacognitive by involving them into self-explanations and in self-monitoring activities, remained better problem solvers as compared to those who did not involve them into such activities. Further, Zimmerman and Schunk (2011) identified

metacognition as an important element of self-regulated learning which mostly have been investigated in experimental settings with controlled variables and environments.

According to Flavell (1979) Metacognitive knowledge is divided into three variables that include knowledge of person, task, and strategy. The benefits of metacognitive activities for learning have been observed. For instance, Chi et al. (1989) found that students who engaged in self-explanations, and thus engaged in more self-monitoring activities, tended to be better problem solvers. White and Frederiksen (1998) found that low achieving students showed learning gains when engaged in metacognitive reflection. Metacognition has also been identified as a critical component of self-regulated learning (Butler et al., 2011). Whereas, the significant research shows the importance of metacognitive engagement in learning in experimental settings to a greater extent under controlled variables and controlled environments (Litzinger et al., 2010). Further, there is little research that examines if students actually use metacognitive strategies during self-directed learning activities. Similarly, very little is known about how students use metacognitive strategies in engineering.

Many researchers have asserted the value of English in engineering education (Pritchard & Nasr, 2004; Joesba & Ardeo, 2005; Venkatraman & Premak, 2007). Further, Pritchard and Nasr (2004) pointed out that English is the major international language of science enabling students to gain professional knowledge through reading texts. Some authors also stressed that engineering students should be equipped with specific skills, which will become valuable resources in their career (Joesba & Ardeo, 2005). For engineering students, reading comprehension ability is important in academic settings and their future career to absorb fundamental knowledge in textbooks and

deepen professional knowledge in their workplace; it is essential for engineering students to read in fluently. Conversely, there are still a considerable number of engineering students who need help in reading in Pakistan. A number of researchers have recognized engineering students' reading difficulty to vocabulary knowledge and recommended lexical education (Alderson, 2000; Mudray, 2006; Shiotsu & Weir, 2007; Ward, 2009). Liao and Chen (2012) suggested that if university engineering students want to equip themselves in their career development, suitable Science and technology materials need to be provided in the courses for reading practices. In addition, Pritchard and Nasr (2004) emphasized that English has been considered as an important international language for engineering students. In other words, acquiring reading skill for technology is required in their workplaces in the future. It was demonstrated that increasing learners' awareness of reading skills could facilitate students' reading comprehension of science and technology texts (Liao& Chen, 2012).

According to Sternberg (1986) and Borkowski, Carr and Pressley (1990) the term metacognition is used in education to enable students to be successful in learning through the use of intelligence in the area of learning. Metacognition relates to thinking highly by involving control over the cognitive processes of students engaged in learning how to read and comprehend the text. The strategies involve in metacognition are planning that means how to approach a reading text in terms of proper meaning, monitoring reading comprehension, and evaluating the progress of reading text. Metacognition is associated with Flavell (1979, 1987) who considered metacognition based on metacognitive knowledge and metacognitive experiences. Further, Flavell (1987) described metacognitive knowledge means acquired knowledge related to cognitive processes and knowledge which is used to control cognitive processes.

However, Keene and Zimmerman (1997) reported that in metacognitive strategies knowledgeable readers make a planning when they read in order to be aware of their thinking and their comprehending process by selecting strategies (afore reading, in the course of reading, and after reading) text. Similarly, readers can recollect their prior knowledge based on their past practices in order to build associations with reading texts to access easily. Alderson (2000) found that knowledgeable readers attempt to cognize the main part of a reading text by evaluating its importance consistently through three levels (word, sentence, and paragraph levels) in reading comprehension. These experienced readers apply self questioning strategy by asking different questions afore, amid, and at the end of reading text to determine the sense of the text by supporting their level of understanding. In addition, these readers sketch out images in their mind to promote their feelings at the time of reading text with the view to involve them completely. Moreover, Anderson (1991) informed that these readers interlink the key facts of the reading with their prior knowledge. Flemming (1997) informed that synthesizing the reading text is very important reading process in which readers assign their own words for forming meaningful concept.

1.1 Research Background

The scaffolding process is used to help students developing the levels of mastery in line of learning within their zone of proximal development (Vygotsky, 1978). James (2010) investigated metacognitive scaffolding and found metacognitive strategies as modeled showing the significant improvement in performance of teachers. Metacognitive scaffolding can be accomplished using strategies either single strategy or multiple strategies to enable students to acquire their needs in comprehension (Pressley et al., 1998). Song (1998) investigated metacognitive scaffolding in the context of Korean