

EXPLORING PERCEPTIONS AND PRACTICES OF READING COMPREHENSION STRATEGIES AMONG ENGINEERING STUDENTS: A LITERATURE REVIEW

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Abstract. Comprehension is important for academic achievement especially in reading tests where complex texts are common. Recognizing the importance of this skill, this paper offers an overview of existing literature that delves into how engineering students perceive and practice reading comprehension strategies. Specifically, this review brings together research on the cognitive and metacognitive approaches used by students in making sure they understand the challenging texts and excel in their reading tests and reading-related tasks. This paper also explores theories, frameworks, and key findings related to comprehension while addressing the specific challenges encountered by engineering students. It also evaluates the effectiveness of strategies such as summarization, visualization, questioning, and predicting. Furthermore, it points out gaps in the current literature and proposes avenues for research to deepen the understanding and teaching of comprehension strategies for engineering students. The insights gained from this review aim to assist educators and curriculum developers ultimately leading to better academic outcomes for engineering students.

Keywords: *reading comprehension, reading comprehension strategies, academic achievement, engineering students, literature review*

Introduction

Reading is at the heart of any education system, so readers need to develop their reading skills. This can be done through reading comprehension strategies. Reading comprehension means processing text, understanding it, and connecting it to what the readers already know. Reading aims to get meaning from the text, which involves both interactive and strategic processes (Nadirah et al., 2020). Tunmer and Hoover (2019) say reading comprehension means reading, processing, and understanding text based on two interrelated skills: word reading and language comprehension. When readers struggle with these skills, they need support. For engineering students, as they answer questions related to a passage, they can convey the meanings of sentences but struggle to pinpoint the strategies they employ. This could stem from an unawareness of the steps they follow while perusing texts. The insights gained regarding engineering students' perceptions of reading comprehension strategies hold significance in second language learning environments as students frequently remain oblivious to their methods and obstacles unless prompted to contemplate their reading approaches (Saidalvi et al., 2022; Mani and Pasupathi, 2018; Nalliveetil, 2014).

Types of reading comprehension strategies

Reading comprehension challenges can hit advanced readers, struggling readers and everyone in between. The literature has categorised reading comprehension strategies. Palinscar and Brown (1984) developed and named four main strategies for improving reading comprehension: identifying the main idea and summarising, questioning, monitoring, clarifying, and predicting. Identifying the main idea and summarising means readers find the key information and put it into their own words. Questioning means readers generate questions about the text they have read. Monitoring and clarifying means readers reflect on their understanding of the text as they read and after they have read to make sure they get it. Predicting means readers make educated guesses about what will come and use their prior knowledge to set expectations. Adams (2010) identify the types of reading strategies: skimming, scanning, making predictions, and questioning. Skimming is a technique readers use in speed reading that involves getting an overview of a passage in a book to understand the organization of the text and the main idea. Scanning is a reading skill that enables readers to quickly find the specific information they are looking for by knowing beforehand what kind of information they need. Predicting is a strategy where readers use information from a picture, illustration or title to make assumptions about the text. Questioning is a method that helps readers monitor their understanding and stay focused and interested while reading.

In a different approach, McNamara (2009) presents six strategies she designed to assist readers in deepening their comprehension of a text and improving their ability to articulate it. These strategies encompass comprehension monitoring, which encourages readers to keep track of their grasp of the material; paraphrasing entails expressing the content in their own words; and elaboration is when readers draw conclusions or pose questions to connect the text with their pre-existing knowledge. Furthermore, logic or common-sense aids readers in utilizing knowledge to comprehend the text, mainly when contextual information is limited. Anticipating what occurs next is part of the prediction strategy while bridging involves linking concepts across sentences, paragraphs, or chapters.

Theories related to reading comprehension strategies

Reading involves two aspects, recognizing words (decoding) and understanding language. Grasping these elements can help teachers identify reading challenges and provide suitable guidance. Gough and Tunmer (1986) proposed The Simple View of Reading theory which highlights the role of decoding in the reading process. The Simple View of Reading theory suggests that word identification abilities, language comprehension abilities, reading comprehension strategies, and reading motivation influence reading comprehension. However, many educators both in the past and present have held the belief that strong language skills alone can lead to comprehension without the need for strong decoding abilities (Taha, 2024; Von Wong, 2023). Beginning and struggling readers are often encouraged to make up for poor decoding skills by guessing words based on their initial letters or pictures and then checking if the word fits contextually within a sentence. Conversely, when the focus of instruction is on decoding, readers are taught to sound out unfamiliar words using all the letters and to read accurately until they reach a reading speed, with precise decoding. Reading skills are essential that students cultivate during their formative school years. They form the foundation for acquiring knowledge across various subjects, serve as a source of pleasure and personal growth and empower individuals to actively participate in their

communities and society as a whole. Another theory related to comprehension is the Progress in International Reading Literacy Study (PIRLS) by Howie et al. (2006). It proposes that comprehension involves processes, such as recognizing words, decoding text, grasping its meaning and integrating information. Furthermore, PIRLS emphasizes components of literacy, including reading purposes, comprehension processes and students reading behaviours and attitudes. This study offers valuable perspectives to educators, researchers and policymakers regarding educational practices in different systems and contributes to ongoing discussions which can improve educational quality for all learners.

In educational settings, it is not just about comprehending individual texts; being able to read and extract information from various sources is also an essential skill. Khalifa and Weir (2009) pointed out that solely focusing on reading at the sentence and text levels is not enough for university students to handle the challenges of academic reading. It is also crucial for learners to engage in careful reading across multiple texts to achieve their academic objectives. Their study on second language reading introduced a significant framework that integrates cognitive, linguistic and contextual aspects of reading into a cohesive model for assessment. This framework explores the role of elements at different levels (overall and specific) along with diverse reading skills and approaches (speedy and meticulous reading). Moreover, it considers contextual factors, like the readers' purpose, comprehension focus, text coverage, reading pace and how these relate to cognitive processes. Khalifa and Weir (2009) created the cognitive reading model as shown in *Figure 1*.

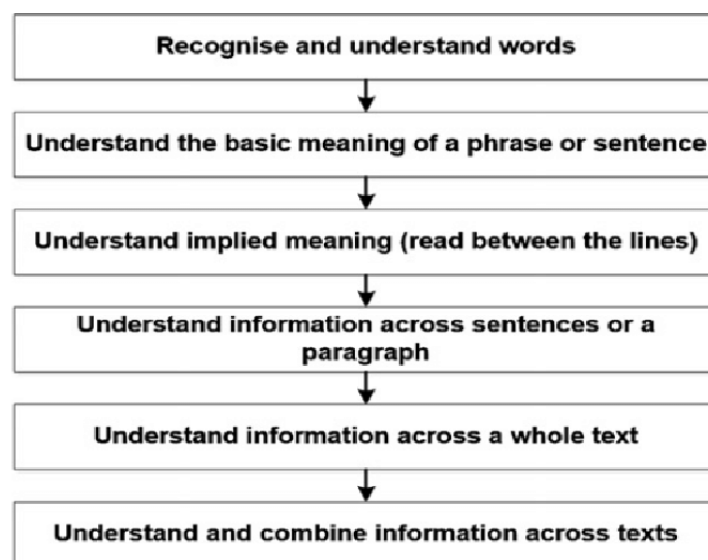


Figure 1. The cognitive reading model.

Past studies related to reading comprehension strategies

A study by Pudín et al. (2021) explores the impact of reading comprehension strategies and English language skills on the reading abilities of Chinese international undergraduates. They also shed light on the challenges these students encounter while reading and the practical methods they employ to improve their understanding. They mentioned that some difficulties include maintaining focus on the task, grasping vocabulary, and comprehending the meaning of phrases, sentences, and paragraphs. The

strategy utilized by all students is compensating for knowledge followed by organizing and evaluating their reading, questioning while reading and employing mental processes. More proficient students favor remembering more effectively and learning from others than those with lower proficiency levels. Denton et al. (2015) researched how adolescents differ in reading comprehension strategies based on their reading skills, grade level, and gender. The findings revealed that generally stronger readers tend to utilize a wider range of strategies than weaker readers and are more adept at determining when to apply them. For example, stronger readers are more inclined to make inferences, monitor their text comprehension, summarise their comprehension after reading and employ targeted strategies to enhance understanding when it wavers. Furthermore, proficient readers used evaluation/integration and regulation strategies more frequently than struggling readers while there were no significant differences in the usage of help seeking and note taking strategies between the two groups.

Research by Banditvilai (2020) focused on assessing how well reading strategies work in boosting comprehension and whether readers can use these strategies while reading. The findings revealed that strategies greatly enhance readers ability to understand content. Readers mentioned that techniques like skimming, scanning, making predictions, visualising while reading and asking questions helped them grasp texts better and they had attitudes towards using these methods. The study also emphasized the importance of providing readers with training or support on effectively using different reading strategies to succeed in comprehending academic materials. Teachers should be trained to impart these skills to them, enabling them to become proficient readers. In a study by Singh et al. (2023), the authors investigate how readers perceive their use of reading strategies. The findings indicate a link between readers' perceptions of difficulties and the strategies they employ. Notably, while 70% of participants rated their English proficiency as "good", most still reported challenges when reading texts. The results revealed that readers often experience feelings of anxiety, low confidence and frustration when facing difficulties with texts. To navigate their reading process, they establish a purpose, preview the material, evaluate if it aligns with their objectives, ask questions before and while reading and consider aspects such as length, organization and predictive meaning. Despite encountering obstacles, respondents actively engage in strategies by reading purposefully and focusing to minimize distractions. This suggests that they employ techniques to comprehend their reading material better. Additionally, the results indicate that these readers utilize problem solving approaches to enhance comprehension. For instance, many adjust their reading pace or revisit passages to improve understanding. They also attempt to deduce the meanings of words, showing that they engage in reading and possess a keen understanding of problem-solving techniques.

Sua (2021) study also highlights the significance of employing strategies to boost reading comprehension abilities in a second language. An initial assessment of needs revealed that readers found reading unenjoyable due to their unfamiliarity with effective reading techniques. The research aimed to explore how cognitive reading strategies could enhance understanding. The strategies examined included making predictions, asking questions before reading, visualizing while reading, summarizing texts using organizers, and responding to comprehension questions afterward. Data analysis encompassed the participants' views on the effectiveness of these approaches. The results indicated that strategies facilitated comprehension by assisting readers in activating prior knowledge, grasping key concepts, and learning new vocabulary.

Moreover, participants could derive meaning from texts, establish a purpose for reading, and enhance their motivation. These findings can provide insights to English or foreign language educators seeking to enhance their student's reading comprehension abilities.

The Gaps

In the reading domain, readers must employ various techniques to navigate their reading journey smoothly. Research indicates that the approaches readers adopt are closely tied to their reading skills, accomplishments and overall success in comprehension (Abeeleh et al., 2021; Edward et al., 2021; Banditvilai, 2020). Nevertheless, many of these investigations have primarily centred on the specific strategies that the readers employed and reading challenges or obstacles that the readers encountered. There is a lack of studies delving into how readers perceive their own strategies. Furthermore, most of the existing research has focused on English as a Foreign Language (EFL) readers in settings with limited inquiries into the perceptions and approaches of readers, particularly among engineering students, in local contexts.

Conclusion

To sum up, this article emphasizes the significance of comprehension techniques for achieving academic success, especially for engineering students dealing with reading challenges. Readers use many reading comprehension strategies. However, through an analysis of existing studies on how students tackle reading comprehension, this review highlights strategies like summarization, visualization, questioning, and predicting since many readers utilize these strategies more than others. This article also addresses the specific obstacles faced by these readers. The paper points out shortcomings in the current research and proposes avenues for future investigations to enhance the instruction and comprehension of reading strategies among engineering students. Ultimately the insights offered aim to assist teachers and curriculum designers in promoting better academic performance in this domain.

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Conflict of interest

We declare no conflict of interest regarding the paper's publication.

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