ENCHANCING SAFETY KNOWLEDGE THROUGH DIGITAL READING MODULES FOR OIL AND GAS WORKERS

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Keywords	Abstract
Safety Departement, Safety Officers, English digital module for oil and gas.	*The survey's findings from several respondents' interviews indicate that the safety department's command of English is still deficient. Due to time constraints, there was no preliminary exam; instead, a module to comprehend and study was delivered right away. The module was developed in the hopes of improving safety officers' and workers' comprehension and knowledge of the significance of workplace safety. This is significant because, despite the safety department's counseling and training efforts, workplace accidents continue to happen. Nine respondents from the safety department participated in a qualitative test that involved interviews to gauge their level of understanding of work safety. The results of the interviews were transcribed to create the module. Two of the nine responders still struggled to understand the English-language test after a digital module was developed especially for the subsequent round of testing. According to the findings, the author still must enhance the module so that participants can comprehend the upcoming instructional materials more readily.*

1. Introduction

In response to workplace accidents, safety officers coordinate thoroughly to ensure all personnel are immediately aware of the incident. Despite the organization's global standing and its established practices including routine toolbox meetings, safety inductions, training sessions, and pre-activity briefings workplace accidents still occur, prompting researchers to investigate potential contributing factors. Although the workplace features extensive safety signage and instructions in English. Although there is various research in English for Specific Purpose (ESP), the development of digital learning materials seems not to have been conducted. Thus, this intrigues the researchers to conduct research on safety reading material in oil and gas field. For this study, researchers considered either a narrow focus on safety personnel or a broader one encompassing all field employees. Ultimately, they selected the safety department as the focal group due to several critical factors. Notably, most of the company's documentation is available in English, yet researchers observed that certain safety staff members continue to encounter difficulties in understanding these materials. To enhance accessibility in field settings, the researchers aim to provide support by developing digital instructional resources. As (Zhu

et al., 2024) discuss, digital tools offer flexible learning environments, facilitating vocabulary acquisition through reading that can occur at any time and place. These digital resources incorporate both text and learner-centered elements, enabling vocabulary development through reading (Vonog et al., 2022) that includes lexical priming, where brief exposure to a formal prompt precedes the target word to strengthen English vocabulary retention.

As a globally recognized language, English serves as a primary medium for extensive communication and holds potential for future growth and support in various domains (Chua, 2021). This scenario aligns with the concept of English for Specific Purposes (ESP). As explained by (Thepseenu, 2020), analyzing learners' needs—referred to as needs analysis (NA)—is a foundational element in designing ESP courses. NA's primary objective, considered essential for curriculum development, is to identify both the language skills that learners can most effectively develop during training and the specific language tasks they must perform in real-world contexts using the target language (Oblova & Gerasimova, 2024).

In developing educational materials, the researchers plan to implement the simplified four-step approach outlined by Borg and Gall: (1) Planning, (2) Product Development, (3) Product Evaluation, and (4) Final Product (Kabatiah et al., 2024). (Bojovic, 2010) emphasizes that English instruction focused on Reading for Specific Purposes is shaped by both the reading objective and the integration of language and skills. Recognizing the role of language and skills is a crucial aspect in ESP reading instruction, underscoring the importance of balancing language acquisition with skill development within the reading component of ESP courses.

2. Literature Review

This research, positioned within the scope of Research and Development (R&D), focuses on creating innovative products. Employing an R&D framework aligns with the study's goal to develop digital instructional resources specifically for microteaching courses, assessing both their effectiveness and success (Ahmed & Roche, 2021). This approach follows the development methodology of Borg and Gall (Kabatiah et al., 2024). Digital tools, known for enabling flexible, anytime-anywhere learning, play a significant role in vocabulary acquisition through reading by encompassing both textual content and learner-centered features. Digital reading resources, as noted by (Zhu et al., 2024), also support lexical priming by briefly introducing a formal stimulus before presenting target vocabulary, facilitating improved retention. In this context, researchers aim to assist safety personnel by providing digital access to learning materials, allowing integration into daily routines. The introduction of digital modules is expected to facilitate easier access for users (Catelly, 2020)who can engage with materials via portable devices, such as smartphones or tablets, thereby promoting on-the-go learning.

According to (Bruggink et al., 2022), a reading strategy can be conceptualized as a "mental tool" that readers employ to support, monitor, and recover their understanding of a text. Strategic readers, characterized by effective comprehension abilities, employ

various techniques to overcome comprehension obstacles and manage their reading processes both consciously and unconsciously. These strategies are categorized into cognitive and metacognitive comprehension strategies (Thongwichit & Buripakdi, 2021). Cognitive strategies immediately facilitate comprehension by assisting the reader in constructing a coherent and contextually appropriate mental model of the text. By engaging these cognitive tools at different stages—before, during, or after reading—readers can enhance their overall understanding of the material (Bruggink et al., 2022).

3. Research Method

This study adopted a Research and Development (R&D) approach, utilizing a streamlined version of the Borg and Gall model (1983), as adapted by (Kabatiah et al., 2024). Prior to the development of reading instructional materials, the author undertook a needs analysis utilizing the focus group discussion (FGD) method. This approach was selected due to the limited number of respondents, which allowed for their simultaneous gathering in a single session. Furthermore, the FGD method facilitates a swift capture of the issues under investigation, specifically the necessity for reading instructional materials. The research focused exclusively on participants from the safety department, comprising nine employees in various roles, including safety foreman, safety officer, senior safety officer, safety document specialist, safety medic, and safety manager in one of oil and gas company in Batam, Riau Island, Indonesia. The FGD was conducted and participants were asked the following questions that adapted from (Ahmed Okasha, 2020):

| No	Topic	Interview Question
1	I look through the text before I read it to see what it is about	What do you do, before read a reading text to find out the content?
2	I use the information I already know about the text.	How do you do if you find difficult words / language that is difficult to understand in the SOP reading text material?'
3	I guess the meaning of the difficult words	How do you do if you find difficult words in the text?
4	I can summarize it in points	When reading the SOP in English.
5	I can relate it to other texts I have already read	when do you feel that the SOP is difficult? or hard to understand?
6	I ask self-questions about the reading text	How do you get more information about what you have read? Do you like reading? Why?
7	I guess the meaning of the difficult words	How do you overcome difficult obstacles when reading the text?

Table 1. Topic Interview Question

4. Result and Discussion

The findings from the need's analysis, derived from FGD interview data, reveal that reading is a critical skill for HSE staff. While varying in comprehension levels, they expressed a strong interest in reading English texts, which is essential given the company's international fabrication standards, requiring English proficiency. To enhance reading abilities, HSE staff are encouraged to study regularly and to practice communicating under expert guidance. emphasize that reading proficiency, (Nugraha & Zaki, 2024) ranks as the third most important skill for professionals in the oil and gas sector. In this study, participants were presented with three reading contexts: reading emails, manuals or work instructions, and reports. Understanding manuals and instructions emerged as the highest priority with a mean score of 3.656, followed by reading emails (3.616) and reports (3.576). However, reading emails posed the greatest challenge, with an average difficulty score of 3.24. HSE staff often encounter comprehension issues with SOP texts, where oral or written inquiries and machine translation are common solutions. Google Translate is a frequently used tool, though it has limitations in accuracy. (Apriyanti & Shinta, 2021) explain that high-quality translation preserves the original content accurately, respects the target language's norms and culture, and ensures clarity for readers.

In developing the English reading material, the researcher employed the four-step technique from Borg and Gall's model, which encompasses planning, product development, product evaluation, and final product. The initial phase, planning, involved creating a blueprint of interview questions intended for the users. Following this, the researcher selected pertinent questions from the blueprint and coordinated a schedule with the company for conducting interviews. Utilizing focus group discussions, the researcher conducted in-person interviews with both management and employees on the designated interview day. After completing the initial implementation, the researcher transcribed the interviews and analyzed the findings, which laid the groundwork for module design.

In the subsequent product development phase, the researcher utilized titles from previously translated Standard Operating Procedures (SOPs) acquired during an internship as a reference for the module's design. The module comprises ten chapters, each addressing critical safety topics: Chapter 1, "Injury at Work," discusses procedures for managing workplace accidents; Chapter 2, "Electric Current," covers the use of electricity and safety measures when operating near electrical sources; Chapter 3, "Falling Objects," focuses on protective measures against falling objects in fieldwork; Chapter 4, "Fire at the Workplace," explains fire prevention and response protocols; Chapter 5, "First Aid Arrangement," outlines appropriate responses to injuries and the necessary first aid equipment; Chapter 6, "Safety Communication," emphasizes the importance of effective communication in preventing accidents and misunderstandings; Chapter 7, "Radiation Safety," details safety practices related to radiation use in the workplace; Chapter 8, "Hazardous and Toxic Substances," addresses the handling of dangerous chemicals; Chapter 9, "Fire Protection and Firefighting," describes the operations of the fire

department and firefighting strategies; and Chapter 10, "Explosion and Debris," explores potential explosion risks associated with ignition sources and explosive mixtures. The module also includes interactive activities and practice questions. To further enhance learning, the researcher designed a series of quizzes to accompany the module, implementing these assessments through Google Classroom, with ten quizzes corresponding to each chapter of the module.
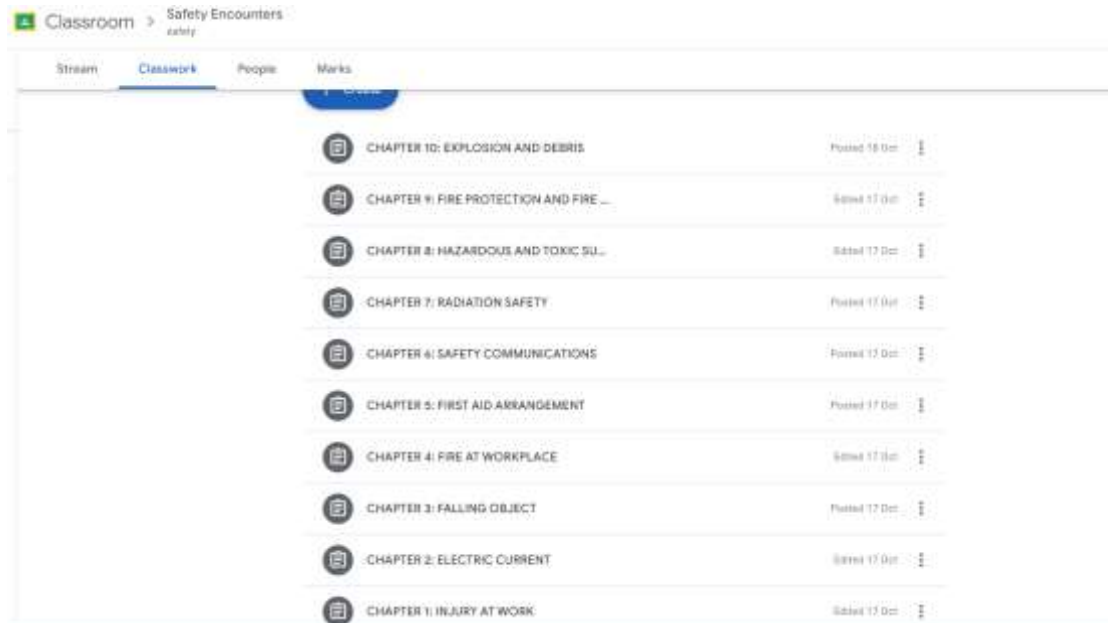
Picture 1. Google Classroom

The subsequent phase in evaluating the product involved the researcher collaborating with a specialist in English for Specific Purposes (ESP) to validate the outcomes of the module. The expert meticulously assessed the module based on the provided evaluation criteria, highlighting specific areas requiring enhancement. Following this, the researcher convened with their supervisor to apply the same rubric for a comprehensive evaluation of the module. Upon gathering feedback from both the expert and the supervisor, the researcher proceeded to the final stage of the process. This involved presenting the module's outcomes to the users, who were invited to review the results and provide evaluations alongside an assessment rubric. Subsequently, the users were asked to complete one of the ten quizzes available. Finally, the researcher conducted an interview with the HSE manager to obtain insights regarding the training and assessments administered.

According to (Syafitri, 2023), E-modules can facilitate the integration of communication, information, and technology in the learning environment. The effectiveness, usefulness, and validity of improving science literacy and critical thinking. However, research has shown that e-modules do not teach students how to read. Along with comprehending, interpreting, anticipating, and defining the words, reading should also involve determining the author's meaning of the piece. Thus, the development of a person's cognitive and affective abilities is greatly affected by their reading abilities.

In addition to additional interactive learning resources, students must learn by assimilating the information included in their reading materials, which could be books, modules, or journal articles. When it comes to reading, motivation is defined as the person's own objectives, values, and beliefs on the subjects, methods, and results of reading. Reading engagement and motivation are positively correlated (Permatasari & Wienanda, 2023)

(Widiastuti & Widayati, 2024) explain that, Learning media makes it easier for students and teachers to connect and communicate throughout the learning process. Learning materials can be transformed, made more efficient, and used to enhance the learning process of students. Through eye-catching pictures, the media can draw and concentrate students' attention on the learning process. This is known as the attention function. The use of media in the learning process that includes visuals that students view when they read graphical texts and because of the inclusion of symbols that can express attitudes and feelings is known as the affective function. For students who struggle and take a long time to learn the material in the text, the compensating function is said to be a highly helpful tool.

5. Review and Feedback

In this section, the researcher will present the findings derived from the review and feedback obtained during the implementation phase. Initially, the results from the assessment rubric evaluated by reviewers and experts will be quantified numerically.

No.		Domain Standard	Standard	average	Mean
1	A	**Introduction textbook**	The introduction provides an overview of the textbook.	3.82	3.61
	B		The introduction section identifies learning resources.	3.82	
	C		The introduction guides students to use the textbook.	3.18	
2	A	**Textbook content**	It balances the theoretical and practical aspects.	3.55	3.60
	B		The content explains new acronyms and expressions.	3.36	
	C		Content is connected to students' needs and experiences.	3.36	
	D		It includes values, facts, and principles.	3.55	
	E		The content covers modern topics.	3.37	
	F		The content develops higher thinking skills.	3.64	
	G		The content presents the material in a logical manner.	3.64	
	H		The content is connected to students' lives.	3.55	
	I		The content presents realistic information.	3.73	
	J		The content presents realistic information.	3.91	

	K		Each unit ends with a summary which introduces the next unit.	3.55	
3	A	**activities in the Textbook**	This textbook includes many activities.	3.73	3.53
	B		These activities encourage students to use learning aids.	3.45	
	C		This activity is suitable for both individual and group work.	3.27	
	D		The activities are appropriate for the level of the students.	3.73	
	E		This activity develops four English language skills.	3.45	
4	A	**Assessment Procedure of Students**	These questions contain higher thinking skills.	3.73	3.53
	B		The assessment comes from the objectives of the textbook.	3.27	
	C		The textbook includes formative and summative evaluations.	3.45	
	D		Students are assessed with different strategies.	3.55	
	E		The questions in the textbook have good question quality.	3.64	
5	A	**Layout Textbook**	The textbook is clearly printed.	3.64	3.67
	B		The textbook has good quality paper.	3.73	
	C		Textbooks have pages.	3.82	
	D		The textbook has clear pictures and photos.	3.91	
	E		The front page of the textbook is attractive and reflective.	3.82	
	F		The last page of the textbook provides complete information about the author and publisher.	3.55	
	G		This textbook contains a list of acronyms and new defining words that define.	3.55	
	H		This textbook has an index.	3.36	

Table 2. Rubric Evaluation

Following this, the researcher will summarize insights gathered from interviews conducted with both the HSE manager and the ESP expert, focusing on their perspectives regarding the module, its content, and the associated quizzes. According to the manager's feedback, the module is highly engaging, and its content is relevant to the specific realities of the field. He noted that the quizzes are appropriate and well-structured, emphasizing that, as English is not the first language for many, gradual practice is essential and that mistakes should not be a source of fear. Based on these interview findings, the manager affirmed that the proposed module could be effectively implemented in the field, although some individuals may struggle with English comprehension; nevertheless, the fundamental concepts remain significant. Meanwhile, the expert's feedback, derived from the interview, indicates that the module is generally satisfactory, encompassing a variety of topics that are adequately addressed. However, it requires enhancements in terms of

content and supplementary materials, particularly concerning safety topics and how safety information is presented within the company. The expert also remarked that the quizzes are comprehensive and exhibit a high degree of variability.

During the implementation of the quiz, the researcher instructed participants to access the Google Classroom platform, which had been shared with safety officials through a URL provided to one of the participants. Prior to completing the quiz, respondents were directed to review and comprehend the content of the first module by accessing the materials submitted by the researcher within the classwork section of Google Classroom. The researcher further clarified that participants had the option to choose from ten different quizzes and could proceed to take the quiz immediately after familiarizing themselves with the module's content.

6. Discussion

Through the need's analysis, the researchers identified a significant demand for proficiency in English, particularly in the areas of reading comprehension and understanding of meaning. Many participants rely on machine translation to decipher unfamiliar meanings, yet some still struggle with reading English and require further improvement. Additionally, while attempting quizzes, several users experienced difficulties comprehending the questions, resulting in lower scores. As noted by (Dillah et al., n.d. 2023), students often face challenges in drawing conclusions, recognizing references, locating specific information, and grasping the meanings of words or phrases when engaging with online texts. Furthermore, online reading necessitates comprehension skills that extend beyond those required for printed materials, posing difficulties for individuals with lower reading proficiency.

Regarding the module that the researcher presented, participants were asked to provide evaluations using a rubric. The assessment results indicated that the standard domain section for the introduction textbook received an average score of 3.61, while the textbook content averaged 3.60. Activities within the textbook garnered an average of 3.53, the student assessment procedures received an average of 3.53, and the textbook layout achieved an average score of 3.67. These scores, all below the threshold of 4.00, indicate a need for improvements in the researcher's module. According to (Saragih et al., 2024), this phase aimed to gather updated data concerning students' identities, needs, challenges, and learning interests—specifically in relation to the project-based learning e-model. Consequently, the assessment results served as a guiding framework for the researcher in developing materials that align with the interests and needs of the students.

Based on the review results and feedback received, particularly from interviews with managers and experts, the author acknowledges certain deficiencies within the learning material module. In response to the insights gathered, the author intends to enhance the module by incorporating several critical elements. These include the introduction of vocabulary usage, the integration of visual representations for words, the inclusion of procedural guidelines at the beginning of each chapter, and the incorporation of workplace warning notifications within the module.

7. Conclusion

The conclusion of this article is that digital reading can assist safety trainer in performing their responsibilities as instructors by ensuring that employees comprehend the material offered and do it more effectively than they did before they read this digital reading. This result expresses the urgency of developing more advance English material for workers in the field of oil and gas.

8. Suggestion

Based on the study's findings, the researcher recommends that the business establish a digital team that can develop digital reading materials both the safety department as well as other departments that require them, especially reading in English on a digital device. Therefore, the writers suggest further study on developing digital learning material for workers in the field of oil and gas.

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