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## THE DEVELOPMENT OF A DIFFERENTIATED WORKBOOK BASED ON STUDENTS' LEARNING STYLES: AN EVALUATION OF ITS VALIDITY, PRACTICALITY, AND EFFECTIVENESS

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### Abstract

A variety of differentiated approach students' worksheets depict pivotal role to support meaningful and interesting English language learning. Through the application of developmental research, this study aimed at designing and developing the feasibility of a differentiated-based workbook to improve students' reading comprehension skills. The developed product was expected to meet the students' needs in accordance with their learning styles. This study was conducted at Faculty of Teacher Training and Education, Sriwijaya University, Indonesia, by applying a model by Akker (1999), which involves the phases of analysis, design, evaluation and revision modified by Tessmer (1993). A model by O'Brein (1985) was also used to identify students' learning styles, namely visual, auditory, and kinesthetic learners. Questionnaire, test and interview were delivered to gain the data from 38 students, in which three participants in one-to-one evaluation, nine students in small group evaluation, and 26 participants in field test. Content validity demonstrated high validity, with the average score of 4,15. Through the construct validity, the workbook had high validity with the average score of 4,65 while technology validity proved its validity with revision in the average score of 4,4. The one-to-one evaluation included three students, with one student exemplifying three distinct learning styles, achieving an average score of 3.8. The practicality and effectiveness of this developed workbook based on learning styles showed excellent result with the average score of 4.16. In summary, differentiated approach-based students' worksheet can be used to teach and improve students' reading comprehension skills.

**Keywords:** differentiated learning approach; learning style; reading comprehension; workbook

### Introduction

The notion of literacy has undergone a significant shift from its conventional definition to a more modern and broader interpretation. Freire (1970) argues that literacy is an essential process, but Rosenblatt (1994) underlines that literacy incorporates the interpretation of various texts and personal experiences. Kress (2010) claims that modern literacy requires new competencies to navigate complex multimodal contexts. Pardo (2004) emphasizes the critical significance of literacy in accomplishing educational objectives, expanding knowledge, and enhancing individual productivity. Relevant research studies indicate that literacy has evolved beyond merely the capacity to read and write to the competence to comprehend and derive meaning from diverse types of text and media. Research studies reveal that critical and multimodal literacy are vital in contemporary education to improve

students' ability to manage complicated and diverse information. Consequently, literacy has evolved into a more comprehensive and intricate term, incorporating not only reading and writing skills but also the capacity to comprehend and derive meaning from diverse types of text and media. However, despite its importance, literacy skills among Indonesian schoolchildren remain inadequate. Even though Indonesia's PISA 2022 ranking is rising, advancing 5-6 positions compared to the 2018 and 2021 PISA results, it indicated poor performance in both reading and writing competencies. Indonesia ranks 71st among 80 participant countries worldwide. Nonetheless, Indonesia's average score in PISA 2022 has declined, especially in reading literacy (OECD, 2022). The lack of reading instructional materials tailored to students' learning styles or needs has adversely affected the literacy skills of Indonesian students. Previous preliminary investigations have yielded unsatisfactory outcomes regarding the writing and reading abilities of Indonesian students. The restricted time available in a reading course, diminished levels of reading interest, the rising prevalence of technology use, and insufficient access to quality books have significantly impacted students' literacy skills. The utilization of current instructional materials remains ineffective and lacks engagement.

According to Solihin (2020), the Ministry of Education and Culture's index rated access to books at a mere 23.1 points on a scale of 100, whereas the nation's reading culture obtained 28.5 points. Due to Indonesia's distinctive geographical characteristics, achieving equitable book distribution is highly challenging, resulting in rural children being overlooked. In line with this, a study by Ghufroon and Risnawati (2014) indicated that in addition to the availability of adequate instructional material, each student is distinct and possesses unique characteristics, specifically their learning styles. Variations in learning styles highlight the most effective and swift approach for a student to gain knowledge from an external source. Moreover, a study done by Anggraini et al. (2020) investigated that students expected to learn in multicultural classes and multicultural experience, especially with diverse learning styles, to improve their English skills. The aforementioned description highlights the necessity for enhancements in the quality of English language instruction in Indonesia. The adoption of a differentiated learning approach presents an acceptable solution by creating a workbook tailored to students' individual learning styles.

In differentiated instruction, teachers must create learning materials, activities, daily assignments, and final assessments that align with the readiness, interests, and delivery methods suited to the diverse learning profiles of students. The phrase "student profile" in this study denotes the variety of learning styles present among students. This research study also applies the definition of learning styles developed by O'Brein (1985), namely auditory, visual and kinesthetic learners. Research studies were undertaken by Sejati and Jaelani (2024), Elviana et al. (2020), Nafiah (2020), and Surdyanto and Kurniawan (2020) concentrating on developing materials for EFL students, namely for reading and pronunciation. Previous studies reported that the availability of reading resources adequately met students' needs based on the students' levels and interests; nonetheless, there is a lack of research about the utilization of students' learning styles. In addition, according to the needs analysis performed during the preliminary survey at the English Education Study Program, Faculty of Teacher Training and Education, Sriwijaya University, the challenges faced in the reading process include insufficient learning resources; students lacking autonomy in their learning according to their needs; a deficiency of workbook that align with the needs and profiles of students, thereby inadequately accommodating the varied learning styles of students.

Examining the lack of workbook tailored to students' learning styles reveals a significant gap. This study aims to address the existing gap by developing differentiated workbook that cater to students with diverse learning styles. Despite earlier studies addressing similar points, Indonesia

continues to position this as an emerging area of knowledge. The limited availability of the workbook fails to align with the foundational conclusions of previous studies.

Nonetheless, it is essential to identify solutions to tackle these challenges. The use of differentiated workbook can certainly be applied to enhance students' literacy skills. The rapid advancement of technology enables English language teachers and lecturers to develop more engaging learning materials tailored to the students' learning styles. This investigation focuses on creating workbook that cater to a wide range of students. In this context, there is a clear necessity for differentiated workbook that is valid, effective, and practical. Such resources offer comfort to students, and facilitate comprehension of the material. There is an expectation that students' reading skills will evolve to be more dynamic and independent. The simplicity of acquiring knowledge and the accessibility of learning materials that align with students' individual learning preferences will certainly positively influence their intellectual growth. This study seeks to answers the questions:

1. What types of learning styles do the participants prefer?
2. Is the developed workbook based on students' learning styles valid??
3. Is the developed workbook based on students' learning styles practical?
4. Is the developed workbook based on students' learning styles effective??

In accordance with these research questions, the aims of this study are to create a differentiated workbook for a reading course tailored to students' learning styles, which is valid, practical and effective.

### **Literature Review**

This section covers a brief explanation about the dynamic definitions of reading comprehension, types of learning styles, concepts of differentiated learning and students' workbooks. In this developmental study, understanding the dynamic definition of reading comprehension, learning styles, the concept of differentiated learning, and students' workbooks can allow teachers to develop more effective teaching practices that are suited to students' needs, enhance students' comprehension and diminish disparities in academic performance and develop student workbooks that match individual students' requirements and facilitate differentiated learning. Consequently, development studies can enhance the quality of teaching and learning process and attain more efficient learning outcomes.

### ***Reading comprehension***

Definitions of reading comprehension has developed dynamically. Traditionally, reading comprehension involves specific thinking processes, including focused instruction in the reading skills based on the processes apply (Mikulecky & Beatrice, 1964). Here, greater awareness of the relationship between cognitive processes reading skills will help students apply the skills when they are reading. In relation to this, Crossley et al. (2008) mentions that reading as an active, intentional, and imaginative cognitive activity wherein readers interact with the text to derive meaning, utilizing both the main information provided and pertinent background knowledge, emotions, and perspectives to interpret the written content. Reading comprehension is the process of concurrently extracting and constructing meaning through interaction and engagement with written language. Reading comprehension is an intentional and active engagement between the reader and the text to derive and formulate meaning. Reading beyond the basic acquisition of new information through the interpretation of written symbols; it is also the process whereby readers integrate their existing knowledge, experiences, and

information with the newly presented content. Reading comprehension requires the formation of a coherent mental representation of the information presented in a text. Reading comprises three interconnected components: the reader, the text, and the activity, all embedded within a wider sociocultural framework. The complexity inherent in reading comprehension has led to the development of numerous influential models and frameworks that seek to explain the various processes involved, such as the activation of prior knowledge and the integration of incoming information with currently active memory contents. Other models and frameworks attempt to account for the components that constitute reading comprehension, including decoding, vocabulary, and language comprehension (Butterfuss & Kendeou, 2020).

Experts broadly concur that the reading process encompasses the bottom-up model (from text to brain) and the top-down model (from brain to text), as outlined by Crossley et al. (2008). In bottom-up model, readers interpret the text (English text) sequentially from left to right, progressing from letters to words and from words to sentences, to comprehend the author's message, then transitioning to the top-down model and top-down model, readers do not interpret the material in a systematic or linear fashion. Readers approach the text with preconceived notions of meaning, utilizing visual information to validate and enhance their expectations. This involves a process of forecasting, sampling, and confirming in which they actively participate. Integrate the information in the text with existing knowledge to develop a meaningful understanding of the discourse.

Mikulecky and Beatrice (2007) in their reading books states that the success of reading class also depends on the quality of adequate instructional material. Students' understanding can be broadened by providing an anxiety-free environment in which students feel comfortable taking risks and trying new ways of reading, enough practice so the students can master new strategies, friendly pressure in the form of persuasion and timing, positive examples of how to approach a text, and a model for the kind of thinking that good reading requires. In accordance to this, it is urged to develop differentiated-workbook on the basis of students' learning styles and needs.

### ***Learning style***

Wilson College (2023) stated that learning style theory serves as an effective instrument for educators to identify the varied needs of students within the classroom. Effective learning styles enable teachers to identify the varied needs that students present in the classroom. The concept of learning styles is an identified approach to facilitate student learning. Learning styles assist educators in understanding how to engage with their students, as these styles reflect individual behavioral patterns. Brown (2000) characterizes learning styles as the methods by which individuals perceive and process information in educational contexts. He contends that learning style preference constitutes a singular facet of learning, pertaining to the selection of one learning environment or condition over another. Learning style pertains to the manner in which individuals assimilate, organize, and process knowledge. By acknowledging this, an individual will find it easier to think. Simplistic and erratic learning methods among pupils will result in failure in the educational process. Consequently, an educator must understand the learner's preferred learning method. Regarding to the types of learning styles, Kolb (1984) divides learning style into the most widely known learning style theory is called VARK, which stands for visual, auditory, reading/writing, and kinesthetic. This learning style theory helps teachers create course material along with its workbook that meets the needs of diverse learners. Specifically, this study refers the predominant learning style model, as noted in O'Brein (1985), comprises visual, auditory, and kinesthetic learning styles.

### ***Differentiated learning***

According to Tomlinson (2001), differentiated instruction is a pedagogical approach that enables students to engage with subject matter in alignment with their abilities, preferences, and individual needs, thereby minimizing frustration and perceptions of failure in their educational experience. Tomlinson emphasizes that teachers can adjust three key aspects to enhance student comprehension of subject matter: the content to be taught, the process or meaningful activities students will engage in during class, and assessment, which involves a final product that measures the achievement of learning objectives. In differentiated instruction, teachers are encouraged to proactively plan and design multiple ways to tailor instruction to meet individual needs and preferences. Additionally, differentiated instruction provides multiple approaches to content, process, and product. During the learning process, classroom instruction can be a blend of whole-class, group, and individual instruction. Tomlinson also notes that learning-style preferences refer to environmental or personal factors that influence how students learn, and teachers can provide students with learning choices to accommodate their individual learning style preferences.

### ***Workbook***

Worksheets include a form of written material, hence reading proficiency may provide a challenge for students with limited reading skills. Law No. 20 of 2003 on the National Education System defines worksheets as tools for students to address learning challenges related to specific content, serving as a resource that can be utilized in educational activities. According to Fotos and Nassaji (2008), Cunningsworth (1995), and Sudjana et al. (2005) mentioned that a practical workbook contains elements of ease of use, appeal, language, evaluation, and time. In recent years, worksheets had emerged as a pivotal element of the curriculum in some countries (Lesley & Labbo, 2003; Martin, Mullis, Foy, & Stanco, 2012; Reid, 1984). Numerous research indicate that effectively designed worksheets positively influenced students' academic performance (Sasmaz-Oren & Ormanci, 2012).

Researchers proposed that teachers employed simpler terminology to assist students (Rix, 2006). O'Leary (2011) developed a framework of worksheets characterized by low average reading difficulty. Preliminary questions are systematically aligned to students of low reading proficiency, while following enquiries necessitate progressively higher levels of literacy. The findings indicated that this type of worksheet could enhance student involvement and task-oriented behavior during independent tasks. Several factors contribute to reading difficulties, including material organization, grammar, word length, sentence length, word frequency, typeface, and line spacing (Department of Education and Science, 2007; Meyer, 2003; O'Leary, 2011).

Reid (1984) argued that teachers frequently utilize worksheets in classes with low-achieving students. This tendency may be attributed to two main factors. Textbooks are tailored for a general student demographic and require adaptation. Worksheets could provide pertinent questions and inspire students, functions that were identified as the most effectively executed by teachers in Reid's (1984) study. Secondly, worksheets functioned as instructional tools that direct students' focus and provided opportunities for independent work, allowing students to progress at their own pace while enabling the teacher to assist those requiring additional support (McDowell & Waddling, 1985).

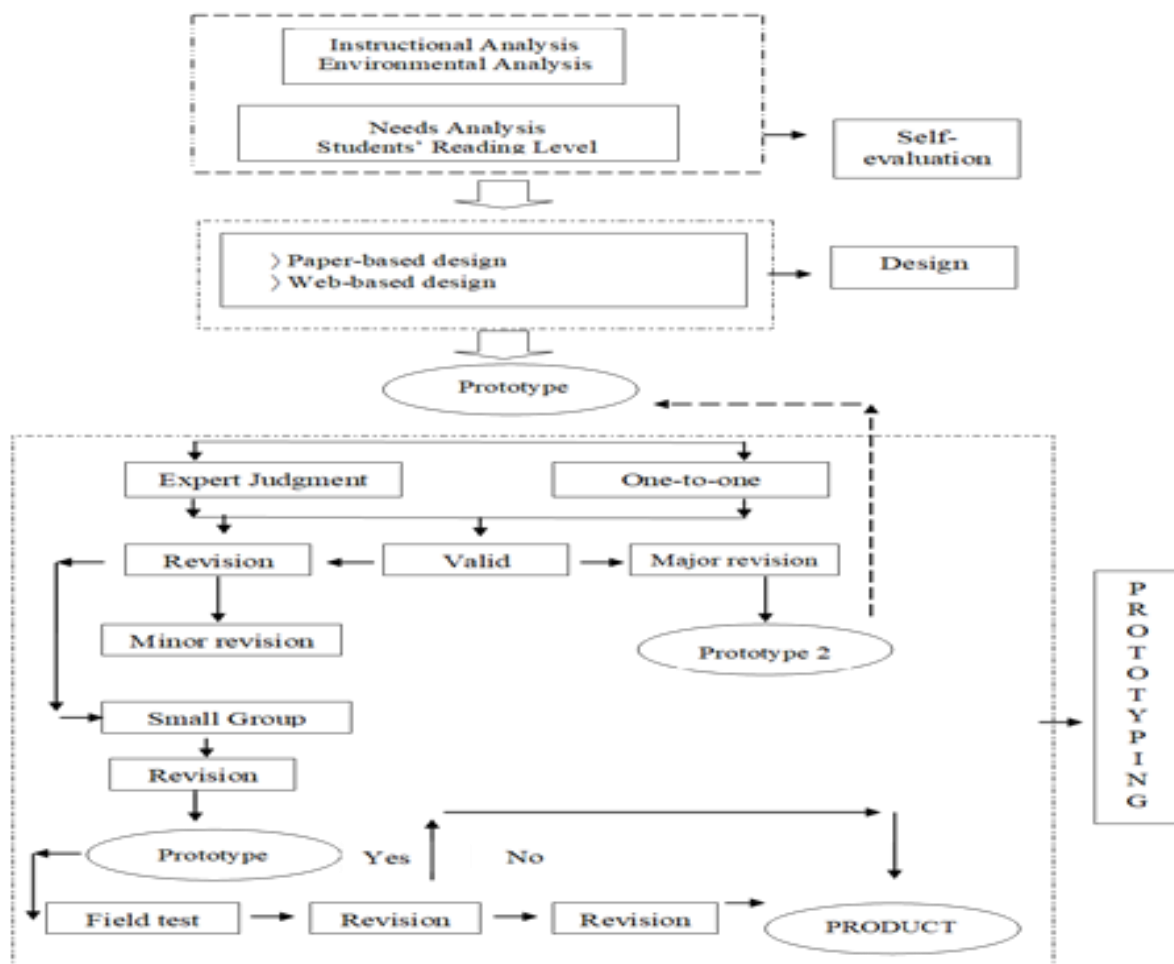


## Methodology

### *Research design and approach of the study*

This research utilized a design formulated by Akker (1999). This study focused on the development of students' workbook through the adaptation as the resulting product. The quality of the developed product was assessed based on three primary criteria: validity (content, language, and instructional design), practicality, and the potential impact of the reading materials. The criteria were assessed during the evaluation and revision phase. Below are the developmental procedures of the developed product.

**Figure 1.** *Developmental procedure by Akker (1999) and Tessmer (1993)*



This developmental study includes analysis, design, evaluation and revision. At first, need analysis was conducted, namely instructional analysis, environmental analysis, students' need analysis, and students' reading level. In the design phase, it includes the procedure to define the objectives, methods, approaches, and media essential to attain educational goals. Next, evaluation and revision

are conducted concurrently. Evaluation is the process of gathering data to ascertain the strengths and shortcomings of the workbook, facilitating the revision of instructions to enhance the efficacy and attractiveness. This study elaborates that the formative evaluation paradigm comprises self-assessment, expert review, individual assessments, small group evaluations, and field tests. Ultimately, in development research, formative evaluation is a crucial activity that must be conducted. Formative evaluation primarily aims to enhance the quality of the product under development. Three quality criteria that require enhancement during the development process are validity, practicality, and effectiveness. Validity was assessed by expert reviews, practicality through one-on-one and small group evaluations, and efficacy through field testing.

### *Research site and participants*

This developmental study was carried out in the English Education Study Program, Faculty of Education and Culture, Palembang, Indonesia. The research participants comprised first-semester students enrolled in the Literary Reading course during the 2023/2024 academic year, together with two instructors who delivered the course.

**Table 1.** *Subjects*

Formative evaluation	Number of students	Notes
One-to-one	3	1 student with low, intermediate, and high English proficiency
Small group	9	3 students with low, intermediate, and high English proficiency
Field test	26	All active students of 2023/2024

### *Data collection and analysis*

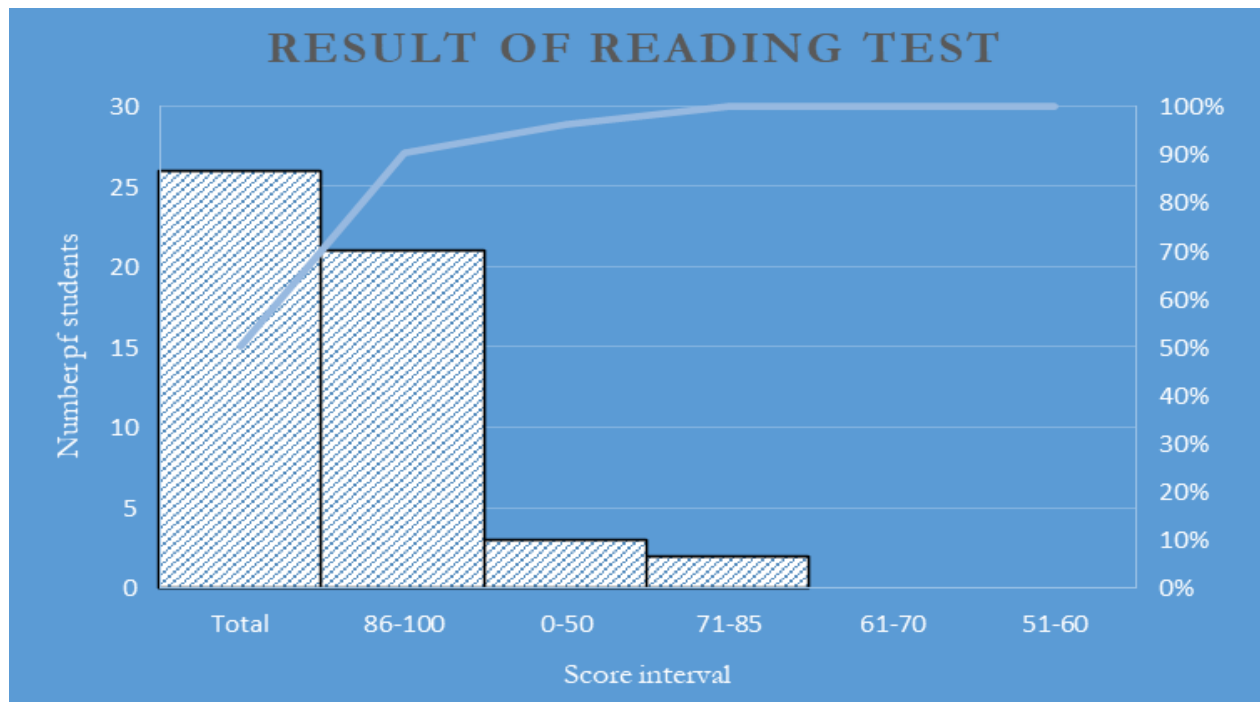
Data collection involved questionnaires, semi-structured interviews, observations, and reading tests. The data collection started from need analysis, design, evaluation and revision phase. In need analysis, the main purpose of the questionnaire directed at students and teachers was to gather data regarding their learning styles, attitudes, expectations, and challenges in the teaching and learning of English. The questionnaire was developed to gather information on the deficiencies and advantages of commonly utilized instructional resources, together with the obstacles faced. A separate 33-item questionnaire was administered to assess the students' learning styles, a model by O'Brein (1985). Besides, the second 33-item questionnaire was administered during the one-to-one and small group evaluation phase to a representative student from each of the three learning styles to demonstrate the validity and practicality of the developed workbook.

Subsequently, observation was conducted to gather data on students' activities employing the developed workbook in relation to their learning styles through the validity process of one-to-one, small group and field test. The interviews were designed to enhance the data obtained from questionnaires and observations for students and teachers. The interview provided recommendations, observations, and constructive criticism from both students and the lecturer. The interview with the two lecturers consisted of seven questions, whereas the interview with the three representative

students comprised three questions. The reading comprehension test was finally administered to assess the potential impact of the proposed product.

To answer the research questions number 2 and 3, the validity and practicality of the developed workbook was conducted through the evaluation result of the expert judgments. The rubric by Tessmer (1993) was developed in accordance with the research questions. In response to the research question number 4, reading test was administered to measure the effectiveness of the developed workbook. The following figure displays the result of the reading test.

**Figure 2.** *Results of field test*



The acquired data were analyzed both quantitatively and qualitatively. The researchers assessed the results from the questionnaire and reading comprehension test employing a quantitative approach and the results of observation and interview were explained qualitatively. The results of multiple questionnaires were utilized to collect data from needs analysis. A learning style questionnaire was analyzed into percentage and reading test was used to demonstrate the effectiveness of the developed workbook during field testing. If 70% of the students achieved the requisite grade, the output may possess a potential impact (Universitas Sriwijaya, 2021). The qualitative method was employed to assess and delineate the interview and field observations. The results of expert judgement during validity and practicality phase of the developed workbook were utilized to one-to-one and small group evaluation. The results were subsequently computed and classified according to particular criteria. The data obtained from interviews with English teachers and students, including their comments and ideas during one-on-one and small group evaluations, were analyzed as supplementary information regarding the practicality of the developed product.



## Results

This section presents the result of the study in order to identify types of students' learning styles and to describe the developmental procedures in each phase, involving analysis phase, design phase and evaluation and revision phase as well. In response to the aims of this developmental study, this phase also reports the validity, practicality and effectiveness of the developed workbook in accordance with students' learning styles.

### *Types of students' learning styles*

From the questionnaire developed by O'Brien (1985), most of students belonged to kinesthetic learners. kinesthetic learners are eager to directly engage in an activity. Visual learners prefer seeing any kinds of demonstration that helps them understand a certain material. In addition, auditory learners listen to what others are explaining. In this phase, participants of the study were different from the participants in the real study.

**Table 2.** *Students' learning styles*

Types of Learning Styles	Number of students
Visual	11
Auditory	2
Kinesthetic	16
Total	29

### *Developmental procedures*

**Analysis Phase**, this phase conducted two analyses, namely instructional analysis and environmental analysis through the display of observation and teacher-student interview results. **Instructional analysis**, this phase is notably illustrated in the curriculum of the English Education Study Program at Sriwijaya University, within the Literal Reading course. In relation to the curriculum content, one specific skill (SS2) was the ability to effectively apply theories, concepts, and principles of English pedagogy in the planning, implementation, and evaluation of English learning, particularly the importance of developing differentiated workbooks to address students' needs (Tomlison, 2014). Workbooks were created in alignment with the students' profiles, particularly their learning styles. The Literal Reading course requires that students differentiate between explicit and implicit information within the text. The analysis of the current workbook revealed that the coursebook content was deemed general, and the differentiated activities remained limited even though the readability level met the students' ability.

**Environmental analysis**, given to the observation, reading class activities remained monotonous in which students mostly spent their time listening to the teacher's explanation, answering question and doing in discussion. Clearly, student had no reading experiences to facilitate their learning preferences. Some highlights were drawn below.

**Table 3.** *Teachers' views*

Themes	Sub-themes	Codes
Reading problems	Linguistic features	Lack of vocabulary
Activities	Reading skills	No experience in fast reading
	Teaching methods	Maximize lecturing strategy
Students' differences	Learning styles	Maximize visual and auditory teaching media
		No kinesthetics teaching media
Developing workbook	Requirements of activities	Suitable readability level
		Fit with students' learning styles
		Various text genres
		Interesting activities

Additional details of the themes above are given below.

**Reading problems**, the first research question aimed to investigate the English language needs of developing workbook, the extent to which teachers and students shaped their beliefs. The two lecturers noted,

“Their reading speed and vocabulary mastery still needs to be improved.” (L1)

“Students' problems in reading were that they were lack of vocabulary and grammar mastery. They are also not accustomed to fast reading of English texts.” (L2)

**Teaching activities**, this part focused on the frequency of teaching modes if the teachers conducted lecture strategy as the main core of the teaching activities and whether individual work, group work and online learning resource can be balance.

“Most of the time I applied lecture method, used simple media and multimedia to support teaching activities.” (L1)

“In each meeting, I usually gave lecture and used additional activities from Google and YouTube. They listened to my explanation during my lecture, read the attached materials and activities and watched Youtube videos that I had already prepared for them on e-learning.” (L2)

**Students' differences**, students' learning styles were different from individual. It was stated that it was necessary to facilitate learners' preferences.

“..... by providing various learning resources and activities.” (L1)

“I only make variations in terms of class activities and reading materials. My lecture and additional teaching videos are probably matched with those who belong to visual and auditory. However, ..., the learning activities for kinesthetic learners are not fully facilitated ...” (L2)

**Developed workbook**, some rules to fulfil regarding the activities. They were suitable readability level, in accordance with the students' learning styles, the availability of various text genres, and the development of interesting activities in reading.

"We should concern with what students' need, provide wide range of text genre, facilitate the students with interesting activities to help them comprehend the reading." (L1)

"The instructional workbook should cover students' needs such as the suitable readability of the used passages. Besides, the learning activities of reading class must facilitate students' learning styles." (L2)

To get in depth discussion from the students' responses, the transcript was broken down into parts.

**Table 4.** *Students' views*

Themes	Sub-themes	Codes
Reading problems	Linguistic features	Lack of vocabulary Lack of grammar mastery
Learning activities	Reading skills Timing Tasks	No experience in fast reading Extend credit hours Balance individual and group work
Developing workbook	Requirements of activities	Include course objectives Suitable readability level Fit with students' learning styles Various text genres Interesting activities

**Problems in reading**, the students' problems were.

"I am concerned with my vocabularies and fast reading." (S1)

"I had problems with my reading speed as I had no experiences on it." (S2)

"My problems are lack of vocabulary and grammar mastery. I also had problems with fast reading. I need much time to finish my reading task." (S3)

**Learning activities.** In a good textbook, both printed and online version, learning activities may be one of the requirements to complete. A variety of learning activities allow the students to experience distinctive learning activities.

"Literal reading class is enjoyable and the activities should be designed with more interaction in the classroom." (S1)

"In literal reading class, the activities can be applicable, interesting, well-structured. The activities should be fit with the learning objectives. Both printed and digital reading textbook should be properly designed." (S2)

"Reading class is a bit interesting as I am not keen on reading. Then, uninteresting activities are not big deal unless the teacher gives enough explanation of a certain

material. The explanation itself should be simply. Time constraints can be extended to be four credit hours. Next, types of classroom activities are suggested to be reduced and need more interaction.” (S3)

“The classroom activities were enjoyable by using proper media. The interaction with other students had enough, like in discussion. Allotted time is enough in three credit hours. The books are suggested to have balance number of activities, both in individual and group work. I personally prefer individual work in because I found no problems in it.” (S4)

***Developing workbook***, the workbook should include course objectives, suitable readability level, in accordance with the students’ learning styles, the availability of various text genres, the development of interesting activities in reading, summary and cover various types of questions for the evaluation, for instance, multiple-choice questions, essay questions, and some other types of questions from low level of thinking skill (LOTS) to high order thinking skill (HOTS) questions.

“I choose multiple choice since such kind of questions are easy to answer. The questions should also be designed from the easiest to the most difficult questions. I prefer scientific references, such as, recent technology advancement. The reading passages also fit with students’ reading level.” (S1)

“I prefer multiple choice and short answer as multiple choice has an exact answer with no various answer from the students. Then, genres are about global information in order that those can be reference and broaden our knowledge about recent updates.” (S2)

“I suggest to create more multiple-choice questions. I like legend textbook due to the fact that it recalls about our historical news and it can be such entertaining references.” (S3)

“The developed reading materials need more pictures since the books cover more as I belong to visual learner. Activities are enough. The explanation is well-structured so that I can easily understand. I also suggest to provide audio and videos to ease the students learn. The topic of passages is more on recent news updates. Types of questions prefer short answers.” (S4))

On the basis of the findings above, there are many types of learning activities can be done. One of the applicable forms is through the implementation of differentiated instructional workbook. The result of the study reported that to create a high level of validity workbook, the teacher must pay attention to the needs and objectives of creating the workbook as each workbook has different uses and purposes, according to their respective functions. Then, in order for the purpose of creating worksheets to be successful according to the learning objectives, the teacher must master the ways of learning well. Teachers must be creative in managing the class and sensitive to learning situations and conditions. Possessing positive attitudes and being highly driven are signs of autonomous learning attitudes.

### ***Design phase***

This developmental study utilized a design proposed by Akker (1999). The design phase focusses on creating the prototype of the product depicted in the printed version. During this phase, several steps were established, including the creation of assessment instruments, the formulation of learning techniques, and finally, the development and selection of instructional materials. The teaching materials adequately addressed the students' demands and adhered to the curriculum utilized in the study program. The advancement of technology was articulated in the learning outcomes of the Literal Reading course. Moreover, the results of the requirements analysis indicated that students employed visual, auditory, and kinesthetic learning styles. The instructional materials were developed utilizing interactive multimedia to meet the students' needs. Consequently, the workbook was offered in alignment with the advancement of scientific and technology utilization and students' learning preferences during the teaching and learning process.

The developed workbook in the Literal Reading course encompassed all course contents, including reading and thinking skills. Reading skills encompassed skimming and scanning strategies, previewing and anticipating strategies, vocabulary enhancement strategies, identifying topics and organizational patterns within paragraphs, and inference-making strategies. Cognitive abilities included critical thinking and timed reading exercises. This product encompassed essential competencies in English and content subjects that could be integrated, including program learning outcomes, course learning objectives, course material explanations, reading comprehension aspects, references, videos, images, and exercises. To finalize the workbook, the researchers developed tasks aligned with students' learning preferences. Nonetheless, no particular vocabulary knowledge was provided. Barcodes were included.

### ***Evaluation and revision phase***

Evaluation and revision phase were conducted concurrently after the design process. In this study, formative evaluation applied in five stages. ***Self-evaluation***, some errors were found, like grammar, misspellings, capitalization, punctuation, the content of the developed products, exercises, and additional tasks. Also, the tasks mostly focused on the images (such as size, color, brightness and so on) and text (such as fonts, size, clarity, and so on), the cover, and the presentation of the material. There were still not adequate activities that met students' preferences. From this condition, after revisions were done, the developed product was ready for expert judgement and validation.

***Expert review***, the aim of this step was to know the validity of the developed worksheet. The validity of the product was assessed based on three aspects, namely content (English language), construct, and media (technology) validity. Based on content and construct validation, expert judgement stated that the product produced was valid without revision. However, the result of media validation showed that the developed product still needed revision. The feedback was to ensure that the links/hyperlinks embedded in the workbook were accessible.



**Table 5.** *Comments on the developed product*

Themes	Sub-themes
Even though the content material was suitable for the students' age, it was so easy for college student	The material was developed from low level of difficulty to high level of difficulty, for example, the revision of word choice, reading text and sample of exercises
No materials were for kinesthetic learners.	Revision was done for kinesthetic learners, especially in additional tasks.
Many multiple-choice questions were found	Revise the question types by varying into any other appropriate questions

**Table 6.** *Validity*

Themes	Average	Sub-themes
English	4.15	High validity
Instructional	4.65	High validity
Media (technology)	4.4	Valid with revision

**One-to-one evaluation**, three students got involved in this phase, one student represented one type of learner. The score was 3.8, which means the developed were practical to use with no significant revisions. **Small group evaluation**, nine students were involved, represented by three students in each learning style type. The result obtained was 4.16, which means that this workbook has high practicality. **Field test**, following the small group evaluation, the developed product was examined on twenty-six students, excluding those who had participated in the one-to-one and small group evaluations. In this stage, reading comprehension test was administered.

## Discussion

In response to the aims of this study, that is designing and developing the feasibility of a differentiated-based workbook to improve students' reading comprehension skills, this study stemmed from the analysis phase. Validity, practicality and effectiveness of the developed product were assured through the evaluation of the developed product from one-to-one, small group and field test. In the first step, the gained data from the interview in analysis phase reported that it positively urges to develop a differentiated-workbook to fulfill students' needs from a diverse classroom. [Kasim and Raisha \(2017\)](#) mentioned that teachers were in agreement that new terminology or vocabulary is the most troublesome issue. They reported that new vocabulary hampered the students' understanding of the reading text. The students think that reading is merely to learn the meaning of the words". Additionally, majority of them claimed new vocabulary is frustrating to students. Students' failure to locate meanings of the new vocabulary will make them frustrated and they might leave the reading task. In addition to the reading problem, teaching strategy variations require the teachers to adjust with the students' conditions, needs and expectations. Diverse learning style also effects the way how the teachers manage the classroom activities. [Akker \(1999\)](#) reported that even though most language learners had multimodal learning style preferences, various teaching strategies need to be used in the classroom to accommodate learners with diverse learning styles, making learning more engaging and

meaningful to students. A study conducted by Anggraini et al. (2023) reported that the reading material should cover students' needs such as the suitable passage readability and could facilitate students' learning styles. Thus, teachers must accommodate the various learning styles of their students in order to urge them to participate in the learning process. This would not only improve the classroom learning environment but also encourage students to pursue and accomplish academic goals. Jennings, J. H., Caldwell, J., & Lerner, J. (2006) mentioned that learning activities and learning materials should cover students' needs such as the suitable passage readability and could facilitate students' learning styles. Concerning instructional workbook, Ghufro (2018) indicated that some difficulties arose as a result of workbook that were uninteresting to the students due to their lack of relevance to their lives.

Moreover, according to the results of the previous studies, students were exposed to monotonous activities. Students frequently listened to instructors' explanations, which may have caused them to become bored. This result was consistent with the research conducted by Khosiyah (2012). According to the findings of their study, current curricula and course materials are not designed with the needs and expectations of students in mind. However, students' demands and expectations demonstrate the need for collaborative learning and instruction. In this instance, students anticipate technologically facilitated learning enhancement aids. On the basis of the findings above, there are many types of learning activities can be done, both online and offline. One of the applicable forms is through the implementation of differentiated instructional workbook. This study was in line with Margaretha (2012). The result of the study reported that to create a high level of validity workbook, the teacher must pay attention to the needs and objectives of creating the workbook as each workbook has different uses and purposes, according to their respective functions. Then, in order for the purpose of creating worksheets to be successful according to the learning objectives, the teacher must master the ways of learning well. Teachers must be creative in managing the class and sensitive to learning situations and conditions. Possessing positive attitudes and being highly driven are signs of autonomous learning attitudes.

To correspond the needs of developing and designing the feasible differentiated-workbook, some steps were continued to the design phase, namely deciding the appropriate learning objectives, grouping students' learning styles, checking students' reading level, drafting the workbook, and constructing reading test. The focus on differentiated instruction used assessment data to facilitate curriculum and instructional modifications that address variations in students' preparation, interests, and learning profiles (Renzulli, 1988; Tomlinson, 2001). During the drafting workbook, differentiated instruction highlights that learning is most effective when teachers analyze students' existing capabilities and learning preferences, then using this data to facilitate students' advancement to higher levels of functioning and learning. Differentiated instruction integrates flexible student grouping with modifications to learning tasks; at times, whole group instruction is the most suitable delivery model, whereas at other times, students engage in small groups or individually to complete tasks tailored to their specific readiness levels, interests, and learning preferences. Among the three dimensions of differentiated instruction, products serve as mechanisms for students to exhibit their acquired knowledge, comprehension, and competencies following an extensive learning time (Tomlinson & Imbeau, 2023). Carol Ann Tomlinson asserts that "a synonym for a product is an authentic assessment," providing teachers with an adequate basis for differentiation. Students may suggest their preferred method of presentation, or teachers may present two options, with the understanding that a third alternative can be negotiated.

Once the product was completed in the design phase, it was analyzed and reviewed. The evaluation phase primarily concentrated on self-assessment, expert review, individual evaluation, small

group assessment, and field testing. Self-evaluation represented a form of formative assessment that evaluated grammatical usage, sentence structure, content, and material presentation. Several problems were identified in the created teaching content, requiring a revision stage. The assessment conducted in one-on-one and small group settings attempted to ascertain the feasibility of the developed product. To test the validity of the developed product, expert judged the content, construct and media validity of the product. Next, the students' feedback indicated that the product was practical, appealing, and feasible for implementation. [Fatmianeri et al \(2021\)](#) and [Anggraini et al \(2025\)](#) determined that the developed product was practical, while adjustments were necessary regarding the use of links in the workbook. Engaging in talks with the English lecturers was crucial to acquire further insights regarding the developed product. [Tessmer \(1993\)](#) elucidated that the designer may assess the efficacy and attractiveness of the teaching to teachers, lecturers or educators to ascertain its potential for successful application in real classrooms. Lastly, the findings of field test showed that there was potential effect of using the developed product as conducted by [Fatmianeri et al \(2021\)](#).

Among the strengths of this developed product, its shortcomings also appeared. The main challenges were related to the participants in majority. However, the challenges related to the teaching and learning classroom and the application of the differentiated workbook were a significant problem. Although the students had high motivation applying the different activities, they argued that the grouping system in relation to learning styles influenced their learning experiences. The complexity of the application of the developed workbook was also the source of this workbook. These findings of the studies were supported by [Aldossari \(2018\)](#). It reported that weakness of students' conviction in using the differentiated instruction strategy (4.03) and students are used to traditional teaching strategies (4.01). The challenges with the highest average were density of students per classroom (4.52), failure to prepare the teacher before service in a way that suits the requirements of differentiated instruction (4.11), lack of availability of educational equipment and Instruments to apply the differentiated instruction strategy (4.05). The challenges with the lowest average were the teacher fears that the school administration will not accept the use of a differentiated instruction strategy with the students (2.35), and concentration of courses on cognitive aspects, prompting and memorization (2.49). Following the steps of development of a differentiated-workbook, the developed workbook was considered valid, practical and effective for students to use. Additionally, this workbook matched the students' learning styles and supported the students' content subjects. Thus, it can be concluded that the developed differentiated workbook can be implemented.

### **Conclusion and Recommendations/Implications**

Students are diverse. One method to address these differences is to offer differentiated workbook that align with students' needs and correspond to their learning styles. This developmental research sought to identify students' learning styles and also to find out whether the developed workbook was valid, practical and effective. The results of this developmental research showed that individual students had distinct learning styles; most of students were kinesthetic learners, while others were visual and students preferred to auditory learning style the least. Following a model by [Akker \(1999\)](#), which involves the phases of analysis, design, evaluation and revision modified by [Tessmer \(1993\)](#), the developed workbook was considered valid, practical, and effective. The validity of the developed workbook included expert judgment. The practicality was also conducted to refine the developed workbook from students' feedback. Evaluation results demonstrated improvements in student reading comprehension skills. These findings confirm that the developed workbook could

address the research questions, offering a feasible differentiated workbook for a betterment in reading comprehension skills. It is proposed that the developed workbook could be integrated into a reading course.

This research evidently has several limitations. The participants were exclusively undergraduates from one university; hence its findings cannot be extrapolated to other educational settings. The subsequent data collected relied on the subjective perceptions of the students. Their actual learning outcomes likely diverge from their perceptions. Future study is expected to involve a broader range of students and institutions.

### **Disclosure statement**

No potential conflict of interest was reported by the authors.

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