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Empowering Indonesian EFL Teachers: The Transformative Impact of Visual Literacy Training on Teaching Materials

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Abstract. Within the contemporary landscape dominated by visual media, educators' proficiency in visual literacy is crucial for effective pedagogy, particularly in English language instruction. This research aims to explore the effects of visual literacy training on the capability of English teachers at Kalam Kudus Elementary School, Bali, to create innovative teaching materials. Utilizing a mixed-methods approach, the research engaged 21 teachers in a professional development program centered on contrast, repetition, alignments, and proximity (CRAP) design principles. The study's methodology combined quantitative and qualitative data, integrating pre-and post-tests, visual literacy questionnaires, and semi-structured interviews to evaluate changes in teachers' visual literacy competencies and their practical application in the classroom. The findings reveal significant improvements: (i) teachers demonstrated a substantial enhancement in their visual literacy skills, with an average Gain Score of 74.15%, reflecting the program's statistically significant effectiveness; (ii) teachers' ability to create visually engaging and pedagogically sound teaching materials was markedly improved; and (iii) despite these gains, challenges in balancing visual design with content selection persist, underscoring the need for ongoing professional development. The research underscores the critical role of visual literacy in modern education, with clear implications for broader educational policy and curriculum design. By integrating visual literacy training into teacher development programs, educational institutions can significantly enhance the quality of instructional materials, thereby improving student engagement and learning outcomes.

Keywords: Visual Literacy; CRAP Design Principles; Visual Literacy Training; English language teaching

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1. Introduction

Visual literacy, as an essential component in global education, plays a key role in understanding and communicating through images, heightening its relevance in an era dominated by visual media. The pervasive influence of visual media in daily life makes visual literacy increasingly recognized as critical in contemporary education. The ability to interpret and create visual content not only enhances communication and comprehension in a media-saturated environment but also facilitates cross-cultural understanding since visual elements often transcend linguistic barriers, allowing for more effective global communication (Scherer, 2015). Furthermore, visual literacy supports the development of critical thinking skills, enabling individuals to analyze and evaluate visual information critically (Ervine, 2016). In the digital age, where images are ubiquitous, the capacity to decode visual messages becomes essential for informed citizenship and participation in society. Integrating visual literacy into educational curricula is thus vital to prepare students for the demands of the 21st century.

In the context of education in Indonesia, teaching English as a foreign language (EFL) plays a significant role and requires innovative approaches to meet the evolving learning needs of students. English language education in Indonesia is crucial for enhancing students' global communication skills and access to international knowledge resources. However, traditional teaching methods often fall short of engaging students and addressing diverse learning preferences. By incorporating multimedia and interactive technologies into the curriculum, educators can significantly improve language acquisition and make learning more engaging and effective (Lundy & Stephens, 2015). For example, the use of digital storytelling and visual aids in English lessons has been shown to enhance engagement and effectiveness in language learning (Gadelshina et al., 2019). Additionally, project-based learning and collaborative activities foster a more immersive and practical language learning experience, which is essential in a visually oriented-educational landscape (Brum et al., 2023).

Despite the importance of visual literacy, many English teachers in Indonesia encounter challenges in integrating it into their teaching materials, often due to a lack of adequate training and the availability of resources. These barriers include insufficient professional development opportunities and limited access to appropriate technological tools, which hinder teachers' ability to effectively utilize visual aids and digital resources in their teaching (Dyak et al., 2022). Moreover, the scarcity of visual literacy programs and materials tailored to the local context exacerbates the problem, leading to missed opportunities for enhancing student engagement and understanding through visual learning strategies (Min, 2019). Addressing these challenges requires a concerted effort to provide targeted professional development and high-quality visual literacy resources for educators.

Training programs designed to develop visual literacy skills can provide teachers with the necessary knowledge and tools to create more interactive and engaging learning materials. Professional development focused on visual literacy empowers teachers to effectively integrate visual elements into their teaching,

equipping them with the techniques needed to design visually rich and pedagogically sound learning materials (Alper et al., 2017). The programs that teach the use of digital tools and visual storytelling can help teachers create more engaging and interactive lessons, thus enhancing the overall educational experience. These initiatives also promote the development of critical visual analysis skills, enabling teachers to guide students in interpreting and creating visual content critically (Krejci et al., 2020).

Visual literacy training is proven to improve teachers' ability to innovate in creating teaching materials, encouraging more effective use of visual media and increasing student understanding. Evidence suggests that teachers who undergo visual literacy training are better equipped to develop innovative teaching materials that leverage the power of visual media (Bach et al., 2021). This training enhances their ability to create lessons that are not only more engaging but also more effective in conveying complex information (Britsch, 2019). Improved comprehension and retention of material are significant benefits for students when visual elements are effectively used in the classroom (Ruiz-Gallardo et al., 2019). Furthermore, visual literacy skills enable students to critically analyze and interpret visual information, fostering deeper understanding and critical thinking (Douglas et al., 2018).

Despite the recognized importance and benefits of visual literacy in education, there remains a significant gap in the availability of structured training programs specifically tailored for English language teachers in Indonesia. This gap is largely due to a lack of institutional support and standardized professional development initiatives focused on visual literacy, which limits teachers' ability to effectively implement these skills (Bachtiar, 2021; Renandya et al., 2018). Additionally, the educational infrastructure in many regions may not provide adequate access to the necessary technological tools and culturally relevant materials, further hindering the integration of visual literacy into English language teaching (Diem & Abdullah, 2020; Hidayat et al., 2023). Previous studies have highlighted the potential of visual literacy to transform teaching practices and enhance student engagement, yet there is a paucity of research that examines the specific impact of visual literacy training on EFL teachers' abilities to create effective teaching materials (Hidayat et al., 2023; Mayuni et al., 2022).

This study aims to address this gap by investigating the effects of targeted visual literacy training on Indonesian English language teachers, with a focus on how design principles such as contrast, repetition, alignments, and proximity (CRAP) can enhance teachers' skills in material creation and improve student outcomes. By bridging this gap, the study seeks to contribute to the development of more effective professional development programs that empower teachers to utilize visual media innovatively and effectively in their classrooms, ultimately enhancing the overall learning experience. The following research questions guide the current research: (1) Does English teachers' visual literacy knowledge differ before and after receiving training materials related to the design principles of contrast, repetition, alignments, and proximity (CRAP)? and (2) How effective

does visual literacy training help teachers enhance their skills in creating teaching materials?

2. Literature Review

2.1 Visual Literacy in Education

Visual literacy, the ability to understand and communicate through visual means, is deeply rooted in human history (Bach et al., 2021; Cordell, 2024). From ancient philosophers like Aristotle, who used anatomical illustrations in medicine, to Pythagoras, Socrates, and Plato, who employed visual images to teach geometry, the importance of visual learning has been acknowledged for centuries. This long-standing tradition underscores the essential role of visual literacy in human cognition and communication (Ahmed, 2024; Dyak et al., 2022; Ervine, 2016; Krejci et al., 2020).

In contemporary times, visual literacy encompasses a wide array of skills that are crucial for developing a deep understanding of various subjects. It is not merely a singular skill but a combination of abilities that enhance one's mental acuity and conceptual comprehension (Kulamikhina et al., 2021; Mnguni, 2014). The Association of College and Research Libraries (ACRL) has defined visual literacy as a set of abilities that enable individuals to find, interpret, evaluate, use, and create visual media effectively (Ruiz-Gallardo et al., 2019; Thompson & Beene, 2020). These skills help learners to analyze the contextual, cultural, ethical, aesthetic, intellectual, and technical components involved in the production and use of visual materials (Mayer, 2021).

In the educational context, visual literacy is pivotal in enhancing teaching and learning experiences. It allows students to critically analyze visual materials like diagrams, charts, and graphs commonly found in textbooks and educational resources. Moreover, it empowers students to create visual representations to express their ideas and understanding, bridging gaps in traditional literacy and fostering a more comprehensive learning environment (Krejci et al., 2020). Addressing deficiencies in visual literacy skills is crucial, as reliance on incidental learning can lead to gaps in understanding. Higher education institutions must adopt frameworks for developing questions on visualizations to identify and address student shortcomings, thereby supporting the development of robust visual literacy competencies (Mayuni et al., 2022). Such efforts can elevate educational practices to new levels, embracing the potential of virtual and visual-digital realities.

In today's society, the production and consumption of texts are increasingly multimodal, involving diverse media and engaging multiple senses. This multimodality extends beyond traditional print-based reading and writing to include various forms of representation (Guinibert, 2020; Villamizar, 2018). Design plays a crucial role in multimodal expression, encouraging imagination, vision, and problem-solving. When students act as both designers and producers, they engage in deeper learning by considering the message, materials, and audience response. Principles of visual design, such as Contrast, Repetition,

Alignment, and Proximity (CRAP), help create visually effective materials that enhance comprehension (Clark-Gareca & Meyer, 2023; Thompson & Beene, 2020).

2.2 Integrating Visual Literacy in English language teaching

Visual literacy has become an integral part of literacy education in contemporary English curricula in various countries, including Australia, Sweden, Denmark, Norway, Finland, Singapore, Canada, and New Zealand. In Indonesia, the Ministry of Education and Culture launched the "Visual Literacy in the Development of Literacy Culture in Schools" program in 2018, emphasizing storytelling pictures to enhance literacy development among students. These visual aids have significantly influenced creativity and comprehension, helping students understand complex real-life situations more effectively (Börner et al., 2019; Sutrisno et al., 2024; Villamizar, 2018).

Research on visual literacy and language learning has highlighted the efficiency of visual literacy strategies in improving students' reading, listening, speaking, and writing skills (Hauptman et al., 2018; Victoria, 2021; Yu, 2019). Successful integration of visual elements in English language teaching involves factors such as the teaching environment, display facilities, the role of students, teachers' visual literacy, and assessment schemes. Visual images, particularly in English for Specific Purposes classrooms, have been shown to enhance observation and reporting skills (Kulamikhina et al., 2021; Sevy-Biloon, 2018; Victoria, 2021).

3. Theoretical Framework

The theoretical framework for this study is grounded in the Experiential Learning Model, which highlights the critical role of life experiences in shaping knowledge through transformation (Kolb, 2015). Over the past two decades, research on experiential learning has significantly increased across various fields, including management, education, information science, psychology, medicine, nursing, accounting, and law. This growth reflects a renewed focus on integrating experiential learning in formal educational settings, especially in higher education (Clark-Gareca & Meyer, 2023; Morris, 2020; Wang, 2023). The model provides a comprehensive understanding of the learning process, emphasizing hands-on experiences, reflection, conceptualization, and active experimentation. These elements are crucial in enhancing teachers' understanding and application of visual literacy in their teaching practices, guiding the design and implementation of visual literacy training for a holistic approach to professional development (Cheng et al., 2021; Girvan et al., 2016).



Figure 1. Experiential Learning Model Framework

The Experiential Learning Model consists of four main stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In this study, concrete experience involves English language teachers in one school in Indonesia who participated in visual literacy training through activities like analyzing visual texts and creating visual materials. Reflective observation encourages teachers to reflect on these experiences, analyzing the effectiveness of various strategies. In abstract conceptualization, teachers connect their reflections to existing theories and knowledge about visual literacy and English teaching, constructing conceptual frameworks. Finally, in active experimentation, the teachers apply their new skills and knowledge in the classroom, continuously refining their practices based on feedback and further experiential learning. This structured approach ensures that teachers develop a deep and practical understanding of visual literacy.

4. Methods

4.1 Research Design

The study employs a mixed-methods research design that integrates both quantitative and qualitative approaches (McCrudden et al., 2019) to thoroughly assess the impact of visual literacy training on Indonesian English language teachers' development of teaching materials. A quasi-experimental design with a pre-test and post-test format was utilized to measure changes in teachers' visual literacy competencies before and after the training. This quantitative component, despite lacking random assignment, effectively evaluates the training's effectiveness in enhancing teachers' application of CRAP design principles. The qualitative aspect complements this by gathering in-depth insights through semi-structured interviews and open-ended questionnaires, exploring the teachers' experiences, perceptions, and challenges in applying visual literacy to their teaching practices.

By integrating these methods, the study provides a holistic understanding of the training's impact, combining empirical data with rich contextual insights. The quantitative analysis, through Paired Sample T-Tests and Gain Score calculations, reveals significant improvements in teachers' visual literacy skills, while the thematic analysis of qualitative data uncovers the nuanced ways in which the training influenced their pedagogical approaches. The mixed-methods design not only quantifies the effectiveness of the intervention but also contextualizes the results within the lived experiences of the teachers, offering a comprehensive evaluation of the visual literacy training's outcomes.

4.2 Research Participants

The research participants selected for this study consisted of 21 English teachers from one primary school in Bali, Indonesia. These participants were purposefully selected by considering the information rich (Bachtiar et al., 2024) and to provide insights into the specific context of English language teaching at that school. These 21 teachers were selected from all English language teachers in that school. The selection aimed to understand how visual literacy training could influence teaching practices in a localized setting, offering a focused examination of the training's effectiveness within a particular educational environment.

4.3 Data Collection Procedure

There were three research instruments used in this study, namely pre-test and post-test, the visual literacy questionnaire, and the interview. The three research instruments utilized a combination of multiple-choice questions, closed-ended questions, and open questions. A well-established pre-test and post-test by Huilcapi-Collantes et al. (2020) and the questionnaire about visual literacy by Yeh and Cheng (2015) that demonstrated reliability and validity in similar investigations were adapted in the current study. These instruments were modified to suit the study context. The administration process of these three instruments is described in Figure 2.

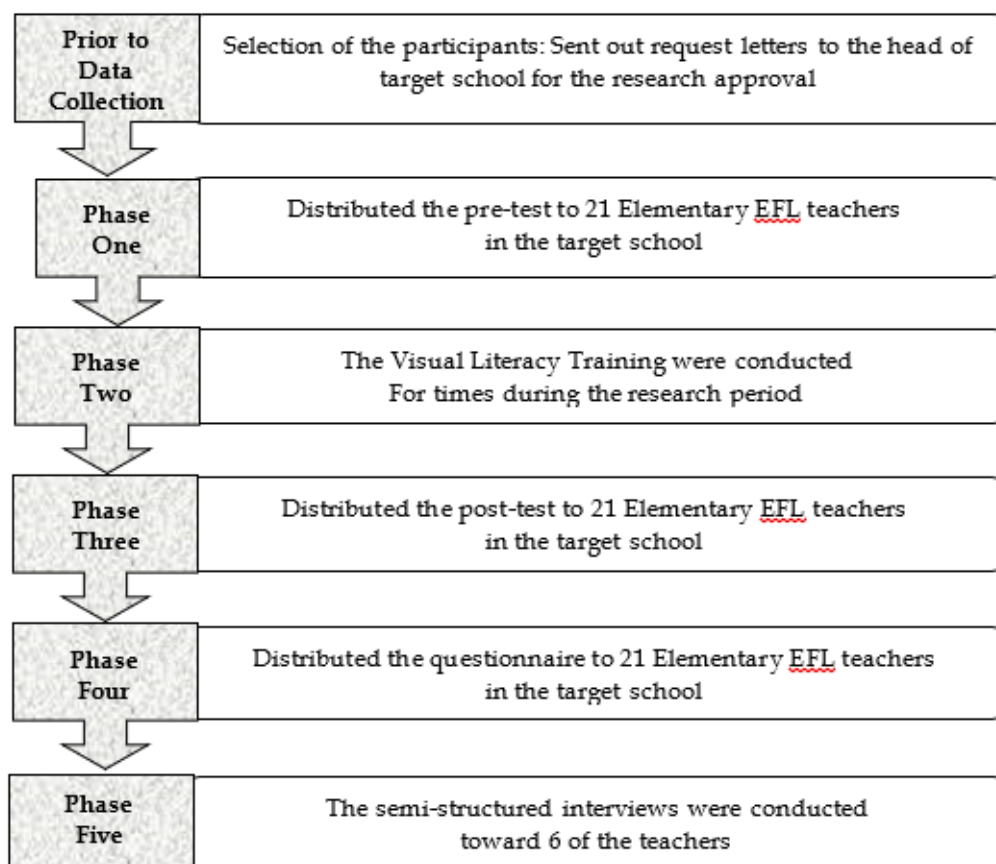


Figure 2. Data Collection Procedure.

4.4 Data Analysis

The data analysis for this mixed-methods study is conducted in two phases, aligning with the dual nature of the research design. The quantitative data, derived from pre-test and post-test assessments, are analyzed using a Paired Sample T-Test to evaluate the statistical significance of changes in teachers' visual literacy skills following the training. The normality of the data distribution is verified through the Shapiro-Wilk test, ensuring the appropriateness of parametric testing. A significance level of $p < 0.05$ is established to determine the robustness of the results. Additionally, the Gain Score is calculated to quantify the improvement in visual literacy skills, offering a clear metric of the training's effectiveness. The analysis reveals a significant increase in the teachers' ability to incorporate CRAP design principles into their teaching materials, as evidenced by a substantial improvement in their post-test scores.

The qualitative data, collected through interviews and open-ended questionnaires, are subjected to thematic analysis. This process involves the systematic coding of transcriptions to identify recurring themes and patterns related to teachers' experiences with visual literacy training. The thematic analysis provides a structured approach to interpreting qualitative data, allowing for the extraction of meaningful insights into the teachers' perceptions, the challenges they encountered, and the practical applications of visual literacy principles in their teaching practices.

By integrating the results from both quantitative and qualitative analyses, this study provides a comprehensive evaluation (Shekhar et al., 2019) of the visual literacy training's impact. The mixed-methods approach not only quantifies the training's effectiveness but also contextualizes the findings within the lived experiences of the teachers, offering a robust and multidimensional understanding of the intervention's outcomes.

5. Results and Discussion

This study employed a mixed-method approach with a quasi-experimental design, incorporating both quantitative and qualitative data to provide a comprehensive analysis of the research questions. The quantitative data, derived from pre-test and post-test measures as well as questionnaire results, were used to assess the impact of the intervention on participants' performance and attitudes. Complementing this, the qualitative data provided insights into the participants' experiences and perceptions, offering a deeper understanding of the observed outcomes. The results and discussion are, therefore, structured to reflect these two distinct yet interrelated types of data.

5.1 Quantitative Results

The quantitative analysis was rigorously conducted using pre-tests and post-tests alongside close-ended questionnaires to measure the changes in teachers' understanding and application of visual literacy principles. The normality of the data was confirmed through a normality test, warranting the application of a Paired Sample T-Test. The significance level was set at $p < 0.05$, aligning with standard research practices to ensure the reliability of findings. This statistical test revealed a significant improvement in teachers' visual literacy, underscored by an average Gain Score of 74.15%, which illustrates the moderate yet impactful effectiveness of the training (Table 1).

Table 1: Enhanced Results of the Gain Score Test Calculation

Item	Pre-Test		Post-Test		Gain Score	
	Means	SD	Means	SD	Means	SD
21 teachers	38.10	9.57	84.05	7.96	74.15	12.04

The findings from the study underscore a significant improvement in the visual literacy of Indonesian English language teachers following targeted training. The pre-test mean score of 38.10 increased dramatically to 84.05 in the post-test, suggesting a robust enhancement in teachers' comprehension and application of visual literacy principles. The average Gain Score of 74.15%, with a standard deviation of 12.04, indicates not only the effectiveness of the training but also a moderate variability in how different teachers benefited from the program. These results highlight the potential of visual literacy training to transform teaching practices, thereby enhancing the educational experience for students by integrating essential visual design principles into the learning process. Similar findings were observed by Huilcapi-Collantes et al. (2020), who reported

significant improvements in in-service teachers' visual literacy following a 20-hour blended learning course.

Further insight into these transformations is provided by the detailed responses to the visual literacy questionnaire (see Table 2). The responses demonstrate a strong consensus among the participants regarding the pivotal role of visual literacy in enhancing English language instruction.

Table 2: The Questionnaire Items and Results

No	Questionnaire Items	SD	D
1.	Visual literacy significantly enhances students' comprehension in English teaching	4.29	0.46
2.	I have a strong understanding of the design principle of contrast in visual elements for effective English teaching materials	4.52	0.60
3.	Repetition in visual elements is a valuable tool for reinforcing key concepts in English lessons	4.19	0.51
4.	I consistently incorporate visual design principles in my visual materials for English instruction	4.62	0.67
5.	I am familiar with the design principle of proximity and its application in organizing visual elements in English teaching materials	4.33	0.73
6.	Visual literacy plays a crucial role in fostering students' language skills in my English classes	4.29	0.72
7.	The contrast in visual design can capture students' attention and engagement in English learning	4.10	0.30
8.	I am confident in applying the design principle of repetition to enhance the retention of English language concepts	4.29	0.56
9.	Effective alignment of visual elements contributes to a better understanding of English content	4.38	0.59
10.	I prioritize the design principle of proximity when creating visual materials for my English lessons	4.38	0.67
11.	Incorporating visual elements aligned with the principles of contrast, repetition, alignment, and proximity is a key aspect of my English teaching practices	4.29	0.78
12.	Visual literacy is an effective means to promote language acquisition in English education	4.43	0.75
13.	The design principle of contrast significantly contributes to creating visually appealing English teaching materials	4.19	0.51
14.	In my experience, the application of repetition has been successful in reinforcing English language concepts for my students	4.24	0.83
15.	Proper alignment of visual elements is essential for facilitating effective communication of English content	4.33	0.48

Notes: M (Mean); SD (Standard Deviation)

The analysis of the questionnaire responses reveals a strong consensus among participants regarding the importance and application of visual literacy in English teaching. The mean scores across all items are consistently high, ranging from 4.10 to 4.62, indicating a general agreement or strong agreement with the statements provided. The relatively low standard deviations, particularly in items related to

the principles of contrast, repetition, and alignment, suggest that there is a uniform understanding and implementation of these design principles among the respondents. These findings underscore the critical role that visual literacy plays in enhancing comprehension, fostering language skills, and effectively communicating content in English education, highlighting its significance as a pedagogical tool in modern instructional practices. These findings are consistent with those of Clark-Gareca and Meyer (2023) and Villamizar (2018), who found that teachers used visual literacy to improve students' reading, writing, and speaking skills.

In addition, the research findings demonstrated a marked improvement in teachers' visual literacy scores, with an average Gain Score of 74.15%, showing moderately effective training outcomes. This indicates that the participating teachers found the training effectively improved their knowledge and understanding of visual literacy principles. The research findings align with prior research (Huilocapi-Collantes et al., 2020; Lundy & Stephens, 2015), which also showed significant gains in visual literacy through professional development programs, though not specifically targeting English teachers. Huilocapi-Collantes et al. (2020) observed notable enhancements in in-service teachers' visual literacy following a 20-hour blended learning course. Similarly, Lundy and Stephens' (2015) investigation into preservice teachers highlighted improved abilities to perceive, analyze, and utilize visual materials post-training.

A more rigorous examination of the results suggests that while the training effectively conveyed the critical principles of visual literacy, there is room for improvement in teachers' confidence and consistent application, particularly in the principles of alignment and proximity. The variations in responses to questions concerning confidence in applying these principles suggest a need for ongoing support and professional development in these areas. These insights could guide future modifications to the training program to ensure a more uniform understanding and application of all visual literacy principles, thereby optimizing the pedagogical benefits across all educators involved. Similar recommendations were made by Clark-Gareca and Meyer (Clark-Gareca & Meyer, 2023) and Dyak et al. (2022) for continuous professional development to maintain and enhance visual literacy skills among teachers.

When dissecting the understanding of the CRAP principles, a substantial number of respondents showed a strong grasp, especially regarding the principle of contrast, with 12 strongly agreeing and eight agreeing, totaling 20 out of 21 teachers. This strong endorsement indicates the training's success in conveying the relevance of contrast in crafting visually compelling teaching materials. Similarly, the principle of repetition was well received, with 15 teachers strongly agreeing and five agreeing (20 out of 21) on its value in bolstering key concepts in English lessons, demonstrating a comprehensive understanding of its role in learning retention. Cappello (2017) further supported these findings by emphasizing the necessity of visual texts in literacy instruction for meaning-making and comprehension.

However, confidence levels in applying the CRAP principles varied among teachers, pointing to the necessity for continuous learning and practice. The questionnaire results show that while the participating teachers were incorporating these principles into their teaching materials, there was a spectrum of confidence, indicating areas where further reinforcement is needed. The acknowledgment of visual literacy's role in language acquisition by a large majority reinforces its perceived value in the educational process and underscores the importance of ongoing professional development in this area to fully leverage visual literacy's benefits in teaching.

The application of alignment and proximity also garnered significant recognition; though specific numbers were not provided, the majority indicated familiarity and confidence in utilizing these principles effectively. The integration of visual design principles into teaching practices was reported by the majority, suggesting a shift toward more visually focused educational methods post-training.

5.2 Qualitative Results

This section presents and discusses the key themes emerging from the qualitative findings, providing a comprehensive view of how English language teachers perceive and integrate visual literacy into their pedagogy. The main themes identified include understanding visual literacy, its impact on skills in creating teaching materials, application of knowledge and skills in teaching materials, practical strategies for incorporation, and the challenges faced in incorporating these skills. These insights reflect a deepened understanding of visual literacy's role in enhancing student learning and indicate a significant evolution in instructional design approaches, emphasizing the strategic use of visual elements to improve educational materials' appeal and effectiveness.

5.2.1 Understanding of Visual Literacy

The findings show that the participating teachers universally acknowledged the relevance of visual literacy in English language teaching (ELT), underscoring its pivotal role in boosting comprehension, retention, and engagement among students. One teacher emphasized,

"Visual literacy is crucial in ELT as it bridges the gap between textual information and visual representation, thereby fostering comprehension, critical thinking, and language acquisition" (Qs.T16).

This perspective aligns with the Dual-Coding Theory, which posits that visual and verbal information are processed through two distinct but complementary channels in the human mind, enhancing learning outcomes when effectively integrated (Papen, 2020). The enhanced understanding of visual literacy was seen as vital in crafting more engaging and accessible English lessons. Another teacher mentioned:

"Incorporating visual literacy allows me to design more engaging English material, making lessons more relevant and easier for students to understand and remember. I also find this approach not only helps in concept retention but also encourages students to actively participate thus making the learning process more interactive and enjoyable." (Int.T3).

Further, most of the participants in the interviews mentioned that visual literacy not only supports the decoding of visual information but also encourages students to express their thoughts visually, thereby enriching communication skills in a second language. One of the participants noted:

"This transformation has had a significant impact on my classroom teaching process. My students are now more adept and easier in expressing their thoughts through visuals, which is important in how to teach students to express their ideas in acceptable English" (Int.T2).

5.2.2. Impact on skills in creating teaching materials

The research findings show that the visual training significantly bolstered the teachers' competencies in developing dynamic and effective English language materials. Emphasis on the CRAP design principles led to a more thoughtful use of visual elements. Following are two quotes representing the participants' views of the impact of visual literacy training in crafting teaching materials.

"Previously, my focus was mainly on content and pairing it with attractive visuals. Now, I strategically employ contrast, alignment, repetition, and proximity to enhance the learning impact. This deliberate use of visual design principles has significantly improved my students' comprehension and retention of the material" (Int.T1).

"The CRAP principles are now integral to my design process, whether I'm crafting presentations, infographics, or educational videos, making my materials both informative and visually appealing. This approach has not only made my teaching more effective but also more engaging for my students, fostering a better learning environment" (Int.T6).

This shift toward a more sophisticated approach is corroborated by findings from Huilcapi-Collantes et al., (2020), highlighting that visual literacy training can significantly improve the presentation of complex information. Moreover, research by Bobek and Tversky (2016) supports the idea that creating visual explanations enhances understanding, particularly for participants with varying spatial abilities, by promoting completeness and coherence in the material.

The findings that show the shift toward a more sophisticated approach to visual design in teaching materials aligns with several studies highlighting the benefits of visual literacy training for teachers. The research by Ruiz-Gallardo et al. (2019) emphasizes the importance of visual literacy for preservice teachers, particularly in creating accurate and informative diagrams, a skill crucial for effectively conveying scientific content. Similarly, Bach et al. (2021) discuss the necessity of visualization literacy across various domains and the challenges of teaching these skills, arguing that structured guidelines and empirical knowledge are essential for developing effective teaching strategies and preventing misuse or misinterpretation of visual data.

5.2.3. Application of knowledge in teaching materials

The research findings notice that effectively integrating the CRAP principles into their teaching materials will lead to more organized and visually attractive content. One teacher said:

"I have become more selective with the images and colors in my presentations, ensuring they enhance learning rather than just decorate the slides," (Qs.T12).

Another participant noted:

"I've applied these principles to the PowerPoint presentations in my English classes, significantly improving student engagement and understanding."

These adaptations indicate that the training has not only equipped teachers with the skills to use visual elements more effectively but also to reinforce key educational messages.

Moreover, several teachers have extended the application of these principles beyond traditional teaching materials into digital realms, such as creating online learning modules and virtual classrooms that are visually coherent and engaging. The following quote represents the participants' views.

"Adopting these principles for digital platforms has revolutionized the way I approach teaching with a blended learning model, making material additions virtually more visually stimulating and much clearer. By incorporating strategic visual design elements, I was able to better capture students' attention, facilitate easier understanding, and improve overall engagement and interaction in a digital learning environment" (Int.T3).

The findings of the study indicate that effectively integrating the CRAP design principles into teaching materials leads to more organized and visually appealing content. This aligns with existing research which emphasizes the importance of structured visual literacy training for educators. For example, research by Davis et al. (2017) underscores that curriculum materials designed to support both teacher and student learning can significantly enhance the educational process. Moreover, the study by Roblin et al. (2018) reveals that curriculum features providing teachers with specific instructional strategies positively impact both teacher and student outcomes, supporting the idea that well-designed visual elements can enhance teaching effectiveness.

In the digital realm, the adaptation of CRAP principles has proven beneficial for creating engaging online learning environments. The work of Mayer (2021) highlights those effective instructional videos, which incorporate principles such as signaling and segmenting, improve learning outcomes by making content clearer and more engaging. Similarly, Huilcapi-Collantes et al. (2020) found that a standards-based curriculum delivered through blended learning environments can significantly enhance student achievement, particularly when visual design elements are effectively employed.

5.2.4 Practical strategies for incorporation

The training provided practical strategies for embedding visual design principles effectively in educational materials. The following two quotes represent the participants' views.

"In creating learning cases as part of problem-based learning in English language learning. I use proximity and contrast to emphasize important parts of questions and statements to assist students in quickly identifying key information. I notice that the strategy helps enough for my students" (Int.T4)

"I now design presentations and formative tests using these principles to clarify questions and statements. I also did this to start practicing higher-order thinking skills for my students. This approach has helped reduce confusion and improve the quality of student responses, which is good." (Int.T1).

The participants also highlighted how these strategies have been instrumental in enhancing the visual clarity of instructional signs and classroom posters, which play a crucial role in setting the context for learning. One teacher said:

"I apply visual design principles to create clear and engaging classroom signage, which helps in maintaining an organized learning environment," (Qs.T.8).

This indicates that the strategy has a practical application that helps teachers in creating a visually stimulating environment that complements the educational process.

The training provided practical strategies for embedding visual design principles into educational materials, effectively enhancing their clarity and organization. This aligns with findings from Yong et al. (2018), who demonstrated that applying visual design principles to web-based educational platforms significantly improves their aesthetic appeal and usability, ultimately benefiting the learning experience. Furthermore, Ghapanchi et al. (2020) found that the visual attractiveness of Learning Management Systems positively impacts student engagement and acceptance, highlighting the importance of well-designed visual elements in educational technologies.

The practical application of CRAP principles also extends to the design of instructional signage and classroom posters, contributing to a more organized learning environment. This is supported by research from Imms and Byers (2017), who found that flexible classroom designs incorporating visual clarity and organization enhance both teacher pedagogy and student engagement, particularly in mathematics. Similarly, Al-Sakkaf et al. (2019) emphasize that visual thinking routines, when consistently applied, promote critical thinking and student engagement by making learning processes more visible and collaborative.

5.2.5 Challenges faced

Despite the benefits, the participating teachers encountered challenges in applying the visual literacy principles, mainly in selecting suitable colors and balancing design with content. The following quotes represent the participants' views of the challenges they faced.

"Finding the right color contrasts is often challenging. Sometimes, the colors I choose don't complement each other well, making it hard for

students to focus. Additionally, balancing the design elements with the content can be quite tricky, as I don't want to overwhelm the students with too much visual information" (Int.T2).

"Time constraints and limited artistic skills sometimes hinder the application of these principles. I need to explore more professional designs to better understand effective visual aesthetics" (Int.T5).

These challenges underline the necessity for continuous professional development and resources to assist teachers in fully integrating visual literacy into their teaching practices. This has also been suggested by Clark-Gareca and Meyer (2023) regarding the need for explicit instruction and support in developing visual literacy skills among English language teachers. The challenge of implementing effective visual design extends beyond individual capabilities to institutional support and resources. Teachers often lack access to quality visual resources and tools, which can impede the application of visual literacy principles effectively. Most of the teachers indicated the limited availability of high-quality images and design software in their school system. These restrict how far they can go with implementing what they have learned.

Furthermore, the integration of visual literacy into learning, including English language learning, often faces bureaucratic hurdles. Where teachers should refer to existing guidelines in schools that also need more structured guidelines on how to embed visual literacy in the existing educational framework. The following quote represents the respondents' perceptions.

"At the teacher level, there is enthusiasm to include visual literacy, especially after they receive training in this regard. However, without clear guidelines from educational authorities, it is difficult to standardize these practices consistently in all classrooms" (Int.T3).

In terms of teachers' limited knowledge and understanding of integrating visual literacy in teaching, there is a need for continuous professional development in this area. This was expressed by most participants who expressed a desire for more advanced workshops and continuous learning opportunities to keep up with the latest trends and technologies in visual design. One of them said:

"To really benefit and understand how to integrate visual literacy in teaching, we need ongoing training that keeps us up to date with the latest understanding and skills. We need to understand the latest tools and techniques, ensuring that our skills remain relevant and impactful to students."

The findings of this study underscore the multifaceted challenges in providing maximum visual literacy training impact. Especially when referring to the ultimate objective of every teacher's professional development activity carried out both by the government and by schools/teacher working groups. It also further proves that not only individual skills development is needed but also institutional support, cultural sensitivity, and ongoing professional development to achieve holistic integration into teaching practice (Britsch, 2019; Domínguez Romero & Bobkina, 2021).

6. Conclusion

The findings of this study underscore the transformative potential of visual literacy training in empowering Indonesian English language teachers to enhance their teaching materials. The significant improvement in the visual literacy skills of the teachers, as evidenced by the notable increase in their pre-test and post-test scores, highlights the efficacy of targeted professional development programs. Teachers demonstrated a robust comprehension and practical application of the CRAP design principles, leading to the creation of more engaging and pedagogically sound materials. This improvement not only facilitated better student engagement and comprehension but also promoted a more interactive and visually stimulating learning environment, crucial for contemporary education.

Moreover, the qualitative data revealed that teachers enhanced visual literacy skills translated into tangible benefits in their classroom practices. They reported increased confidence in utilizing visual elements to clarify and emphasize key concepts, thereby improving student understanding and retention of material. However, the study also highlighted the need for ongoing professional development to address challenges in balancing design with content and selecting appropriate visual elements. Continuous support and resources are essential to sustain and further enhance the visual literacy skills of teachers, ensuring they can fully integrate these principles into their pedagogical practices.

7. Recommendations and Limitations

Based on the key findings, it is recommended that educational institutions and policymakers prioritize the inclusion of visual literacy training in professional development programs for teachers. Such training should be comprehensive, covering the CRAP design principles and offering practical strategies for their application in various teaching contexts. Additionally, continuous professional development opportunities should be provided to address the evolving challenges teachers face in integrating visual literacy into their teaching materials. Ensuring access to quality visual resources and technological tools will further support teachers in creating effective and engaging educational content.

This study's limitations include its quasi-experimental design and the specific context of a single primary school in Bali, which may limit the generalizability of the findings to other settings. The sample size of 21 teachers, while sufficient for this context, may not reflect the broader population of English language teachers in Indonesia. Additionally, the reliance on self-reported data through questionnaires and interviews could introduce bias, as participants might provide socially desirable responses. Future research should consider a more diverse sample and incorporate longitudinal studies to assess the long-term impact of visual literacy training on teaching practices and student outcomes. Future research should also consider including variables such as teachers' length of tenure, age, and gender for a more comprehensive analysis.

8. References

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