English Morphological Awareness in Complex Words through Color Coding for Reading Comprehension

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Abstract
This study aimed to construct a hybrid learning model that underlines morphological awareness of complex words through color coding for reading comprehension. Path analysis was used to evaluate the relationship between non-English major undergraduates' morphological awareness of complex words related to lexical inferencing ability and their success in reading comprehension. The instruction and tests, including the pretest, practice test, and posttest, were administered in the classroom and online via teaching applications. The participants were 200 non-English major undergraduates from a business administration faculty. The results indicated that the hybrid learning model had measured validity and reliability. Color coding on derivational and inflectional morphemes was a significant moderator of morphological awareness, lexical inferencing ability, and reading comprehension.
Keywords: Hybrid learning model, Morphological awareness, Complex words, Color coding, Reading comprehension, Pretest-posttest design, Path analysis.

Introduction

Reading plays a vital role in knowledge acquisition, language learning, and academic development (Anderson, 1999; Achara Wongsothorn et al., 1996; Suphat Sukamolson, 2014). For university students, reading comprehension is crucial for acquiring new skills and preparing for future careers (Gough & Tunmer, 1986; Hock & Mellard, 2005; Hoover & Gough, 1990; Perfetti, 2007). In the context of Thailand, English proficiency is essential for Thai workers to meet the demands of the 4.0 labor market and foster economic growth (Thunyalak Weerasombat, 2018). Non-English-major students comprise a

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significant portion of university students and require academic support to enhance their English reading comprehension skills. As students' progress to higher academic levels, their vocabulary needs become more complex. University texts and readings often involve advanced concepts and require a general understanding of new vocabulary. However, vocabulary teaching strategies may not always be responsive to these needs, particularly when students come from diverse fields of study. Lifelong learning strategies have been suggested to improve vocabulary knowledge among university students. For instance, Suwaree Yordchim & Toby J. Gibbs (2014) propose effective learning strategies that provide both the form and meaning of words to help students understand and infer vocabulary in context. While courses focusing on high-frequency, active words can be beneficial, they may not lead to substantial improvement in students' word knowledge. Non-native English speakers seeking to improve their reading comprehension and vocabulary acquisition can do so independently by engaging in consistent and intentional reading practices. By regularly reading challenging materials, learners can improve their ability to comprehend complex sentence structures and understand idiomatic expressions commonly used in English. To further enhance their vocabulary acquisition, learners can use online resources such as flashcard apps and vocabulary-building websites. Another helpful strategy is to read articles or texts specifically geared towards teaching new vocabulary, as these materials often provide context and usage examples that can help learners solidify their understanding of new words and phrases.

The question of whether facilitators and teachers should provide tools to support vocabulary acquisition arises. Online dictionaries, such as e-dictionaries, have become popular options as they offer quick access to word definitions and engage learners of all levels. Several researchers have explored the use of e-dictionaries for ESL/EFL reading comprehension and highlighted their benefits compared to traditional paper dictionaries in terms of speed and targeting of word knowledge (Grimshaw et al., 2007; Shen, 2013; Tavakoli & Akbari, 2015; Wright et al., 2013). However, English fluency and proficiency remain essential for tasks like presenting work or participating in interviews where e-dictionaries are not permitted.

Furthermore, an important research issue revolves around the ineffectiveness of e-dictionaries in vocabulary learning. Studies have shown that while e-dictionaries can enhance reading comprehension, they may hinder vocabulary retention (Hamdi, 2015). The retention of vocabulary appears to be more critical than mere word learning. This finding underscores the need to reconsider how non-native English speakers can independently improve their reading comprehension while also benefiting from vocabulary acquisition.

Literature review

Morphological Awareness

Morphological awareness, the understanding of how words can be broken down into meaningful units such as roots, prefixes, and suffixes, has been found to significantly contribute to reading and comprehension abilities (Carlisle, 1995). Research has shown that training in morphological awareness improves conscious knowledge of the structure of words, including inflectional, derivational, and compound morphemes (Carlisle, 2003; Singson et al., 2000). Teaching morphological awareness often begins with inflectional suffixes and neutral derivational morphemes, progressing to more complex non-neutral derivational morphemes that require phonological, orthographic, and morphological processing (Carlisle, 2000, 2003). By breaking down complex words into morphemes, readers can decipher and understand them, leading to improved word identification, meaning inference, and comprehension (Perfetti, 1988; Kuo & Anderson, 2006).

Teaching Morphology for EFL

In the context of English as a foreign language (EFL) instruction, morphological awareness has been found to enhance reading performance and facilitate the understanding and application of complex spelling patterns (Nunes et al., 2006). Furthermore, students with learning disabilities may particularly benefit from morphological education, as it can serve as a support for their morphological processing difficulties (Champion, 1997; Carlisle, Stone, & Katz, 2001). Understanding morphological units, syntax, and spelling can contribute to improved language outcomes and comprehension for EFL learners (Casalis et al., 2004).

Language Learning and Color Perception

Color coding has been widely used in psychology studies to identify and classify objects, with little effect on object identification and classification but some significance in specific image segmentation tasks (Joseph & Proffitt, 1996; Wichmann et al., 2002). Applying color coding in language learning and visualizing data can enhance cognition and facilitate the identification of patterns and connections (Kirk, 2019).

Lexical Inferencing Ability

Lexical inferencing, the ability to guess the meaning of unknown words based on linguistic and nonlinguistic cues, is crucial for establishing a coherent understanding of a text (Haastrup, 1991). It has been shown to significantly impact reading comprehension, particularly for foreign and second language learners (Oakhill et al., 2014). The mental effort

involved in lexical inferencing contributes to word retention and comprehension (Oxford, 1990).
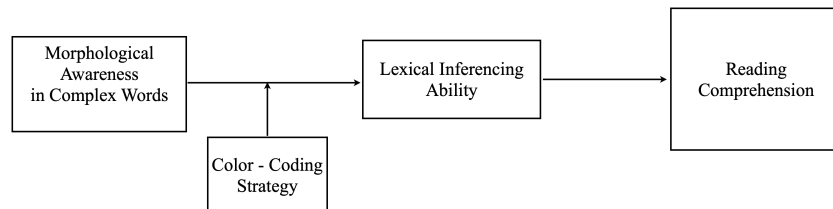
Hybrid Learning Model

The hybrid learning model integrates teaching and learning practices and has been proposed as an effective framework for designing language learning experiences (Masson et al., 2008). It combines face-to-face and online components, providing flexibility and adaptability to unforeseen circumstances such as pandemics or natural disasters (Akla, 2021). This model has the potential to support effective teaching and learning practices, enhance student adaptation, and provide a structured framework for language learning design.

While previous studies have examined the importance of morphological awareness, color perception, and lexical inferencing ability in language learning, there is a research gap regarding the development and assessment of a hybrid teaching model that combines morphological awareness, color coding, and reading comprehension for non-English-major university students. This study aims to bridge this gap by developing and evaluating a Hybridge teaching model of Morphological Awareness in Complex Words through Color Coding for Reading Comprehension, addressing the specific needs of non-English-major students, and contributing to effective language learning outcomes.

The study

This study develops a color-coding teaching model to improve reading comprehension of complex words. It focuses on morphological awareness and utilizes prefixes and suffixes to enhance understanding. The aim is to enhance English reading comprehension for non-English-major university students using cognitive vocabulary learning with color coding. The research also considers the importance of category and vocabulary levels for post-graduation employment. A hybrid instructional model combining online and in-person learning is proposed, drawing from lessons learned during the Covid-19 pandemic. The conceptual framework, represented by the MACC model, guides the research process and illustrates the relationship between variables.

Figure 1: The Conceptual Model visually represents the relationship between variables in the study. It outlines the research objectives and demonstrates how they converge to draw meaningful conclusions. The model, referred to as the MACC model, takes the initial alphabet of the variables into account.

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┌─────────────────┐                ┌─────────────────┐        ┌─────────────────┐
│  Morphological  │                │ Lexical Inferencing │      │     Reading     │
│   Awareness     │────────┐       │     Ability     │───────▶│  Comprehension  │
│ in Complex Words│        │       └─────────────────┘        └─────────────────┘
└─────────────────┘        │
                    ┌──────┴──────┐
                    │ Color - Coding │
                    │   Strategy   │
                    └─────────────┘
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Research Objectives

The major aim of this study is to develop and assess a Hybridge teaching model of Morphological Awareness in Complex Words through Color Coding for Reading Comprehension. The action objectives are as follows:

1. To assess the mean difference between scores of morphological Awareness (Pretest) and Reading Comprehension (Posttest) after receiving instruction on morphological Awareness in Complex Words through Color Coding for Reading Comprehension.

2. To validate the proposed model of causal relationships among dimensions of Morphological Awareness, Lexical Inferencing Ability, and Reading Comprehension.

3. To assess participants' satisfaction with the content, technique of using color coding, equipment and teaching program, and instructor of the teaching program.

Research Hypotheses

H1: There will be a significant difference between the average scores of Morphological Awareness (pretest) and Reading Comprehension (posttest) ($p < 0.05$).

H2: The proposed model of causal relationships among dimensions of Morphological Awareness, Lexical Inferencing Ability, Reading Comprehension, and English-Based Knowledge will demonstrate a close fit to the empirical data, as assessed by statistical fit indices ($p < 0.05$, CMIN/DF < 5.0, GFI > 0.9, RMSEA < 0.08).

H3: There will be a significant difference in participants' satisfaction scores among different aspects of the teaching program, including content, technique of using color coding, equipment and teaching program, and instructor ($p < 0.05$).

1840

Methodology

The study population consisted of 444 non-English-language majors enrolled in an English course at a university in Thailand. The participants, aged between 19 and 25 years old, were selected from the three programs of the Bachelor of Business Administration (BBA) in the Faculty of Business Administration. A sample size of 159 participants was estimated using Calculator.net with a 95% confidence level and 5% margin of error. A pilot test was conducted with 30 participants, resulting in the elimination of 12 due to poor data quality. The final sample size consisted of 200 participants, including 68 males and 132 females, representing all three programs of the BBA.

The instructional design involved translating learning ideas into unique materials and activities, supported by a literature review on 50 affixes. The pilot study confirmed the suitability of the affix items for the participants.

The experiment involved several steps: pilot test, pretest, treatments using Morphological Awareness in Complex Words with Color-Coding technique, practice test, ongoing treatment administration and review, posttest, questionnaire trial, and final satisfaction evaluation.

Tools and measurements administered through TestPortal and MsTeam applications ensured efficient and standardized data collection. These included a morphological awareness pretest, lexical inferencing ability practice test, and reading comprehension posttest. Participant satisfaction was assessed using a Likert scale questionnaire across content, color coding technique, equipment and teaching program, and instructor. Tools' reliability and validity were established through item and factor analysis, as well as expert review.

The treatment consisted of a comprehensive learning package, including aligned reading comprehension texts, PowerPoint slides as visual aids, handouts and activities, and guided practice activities with feedback.

The data collection procedures followed a systematic approach, starting with the pilot test to ensure the quality of the instruments. The pretest and posttest measured participants' knowledge of affixes and reading comprehension skills. The practice test provided opportunities for participants to practice their lexical inferencing ability. Finally, the questionnaire assessed participants' engagement and satisfaction with affixes learning. The collected data from these procedures were analyzed to evaluate the effectiveness of the treatment in enhancing participants' morphological awareness and reading comprehension skills.

The instruments used in this study were carefully assessed for reliability and validity. Item analysis was conducted on the pilot test to evaluate the instruments' reliability. The results showed three levels

of difficulty: hard (66% of items), medium (34% of items), and no easy items. This indicates that the pilot test items were appropriately challenging and reliable measures of participants' familiarity with 50 affixes.

For validity assessment, exploratory factor analysis (EFA) was performed. The factor loadings indicated the strength and direction of the relationship between observed variables and morphological awareness dimensions. The obtained factor loadings for each dimension were as follows: Derivational Morpheme Adverb Suffixes (0.728), Derivational Morpheme Prefixes (-0.448), Derivational Morpheme Suffixes (0.428), Class-Changing Prefixes (0.426), and Inflectional Morpheme Affixes (0.400). These results confirm the construct validity of the instrument, except for Derivational Morpheme Prefixes. Further studies should explore other aspects of validity to enhance the measurement of morphological awareness.

The data analysis in this study focused on testing hypothesis 1, hypothesis 2, and hypothesis 3. Hypothesis 1 was tested using t-tests to compare the mean scores of Morphological Awareness (Pretest) and Reading Comprehension (Posttest). Hypothesis 2 was examined using path analysis to confirm the causal relationships among Morphological Awareness, Lexical Inferencing Ability, and Reading Comprehension. Hypothesis 3 explored participants' satisfaction scores across different aspects of the teaching program, utilizing x-bar and standard deviation values. The data analysis employed appropriate statistical techniques to evaluate the hypotheses and provide valuable insights into the relationships and effects of the variables studied.

Results

As the primary objective of this study was to develop and evaluate a hybrid teaching model for morphological awareness in complex words through color coding to improve reading comprehension among non-English language majors at a university in Thailand, the results section aligns with the research objectives and hypotheses of this study. It presents the findings related to assessing the mean difference in scores of morphological awareness and reading comprehension, validating the proposed model of causal relationships, and evaluating participant satisfaction. The section provides a detailed analysis of the results in accordance with these objectives and hypotheses.

Hypothesis 1: Hypothesis 1 examined the difference in mean scores of Morphological Awareness (Pretest) and Reading Comprehension (Posttest).

Table 1. t-Test Comparison of Means of Reading Comprehension Scaled Scores by Pretest and Posttest

Variables	Pretest		Posttest			
	Mean	S.D.	Mean	S.D.	t	p
Scores	14.23	3.325	21.55	7.510	-14.648	0.001

The paired samples t-test revealed a significant difference between the two groups (t = -14.648, p < .05). The posttest scores (M = 21.55, SD = 7.510) were significantly higher than the pretest scores (M = 14.23, SD = 3.325), indicating improvement in reading comprehension after the intervention.

Hypothesis 2: The path analysis results confirmed Hypothesis 2, indicating that the model of causal relationships among Morphological Awareness's dimensions, Lexical Inferencing Ability, and Reading Comprehension closely fits the empirical data. The goodness-of-fit test demonstrated that the model had a good fit. The Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), and Normed Fit Index (NFI) exceeded the threshold value of 0.90, indicating a satisfactory fit (Arbuckle, 2016). The ratio of model fit statistics to degrees of freedom ($\chi2/df$) was 1.618, which is below the threshold of 3 for adequate model fit. The Root Mean Square Error of Approximation (RMSEA) value was 0.056, indicating an acceptable fit. Therefore, the model can be classified as closely fitting the empirical data.

Table 2. Results of Total Effect (T.E.), Direct Effect (D.E.), and Indirect Effect (I.E.) among Morphological Awareness's dimensions, Lexical Inferencing Ability, and Reading Comprehension.

EndogenousVariables / Exogenous Variables	Parameter Coefficient	Lexical Inferencing Ability			Reading Comprehension		
		TE	IE	DE	TE	IE	DE
Derivational Morpheme Suffixes (DMS)	Unstandardized	0.751***		0.751***	0.399	0.399	
	Standardized	0.237***		0.237***	0.124	0.124	
Derivational Morpheme Prefixes (DMP)	Unstandardized	0.043		0.043	0.023	0.023	
	Standardized	0.009		0.009	0.005	0.005	
Class-Changing Prefixes (CCP)	Unstandardized	1.224**		1.224**	0.650	0.650	
	Standardized	0.176**		0.176**	0.092	0.092	
Derivational Morpheme Adverb Suffixes (DAS)	Unstandardized	-0.256		-0.256	-0.136	-0.136	
	Standardized	-0.032		-0.032	-0.017	-0.017	

Inflectional Morpheme Affixes (IMA)	Unstandardized	0.460		0.460	0.244	0.244	
	Standardized	0.081		0.081	0.042	0.042	
Lexical Inferencing Ability	Unstandardized				0.531***		0.531***
	Standardized				0.523***		0.523***
Squared Multiple Correlations							
Variables		Lexical Inferencing Ability			Reading Comprehension		
R^2		0.093			0.274		

*** p < 0.001, ** p < 0.01, * p < 0.05

Table 2 presents the results of the total effect (T.E.), direct effect (D.E.), and indirect effect (I.E.) among Morphological Awareness's dimensions, Lexical Inferencing Ability, and Reading Comprehension. The researchers assessed the model's robustness using AMOS, examining the relationships among various dimensions of Morphological Awareness and the two outcome variables, Lexical Inferencing Ability and Reading Comprehension. The t-statistics associated with these relationships were used to test their significance, with p-values considered significant at the 0.05, 0.01, and 0.001 levels.

The results showed that Derivational Morpheme Suffixes (DMS) had a significant positive influence (p<0.001) on Lexical Inferencing Ability (Direct effect = 0.237). Similarly, Class-Changing Prefixes (CCP) had a significant positive influence (p<0.01) on Lexical Inferencing Ability (Direct effect = 0.176). Furthermore, Lexical Inferencing Ability had a significant positive influence (p<0.001) on Reading Comprehension (Direct effect = 0.523).

Figure 2
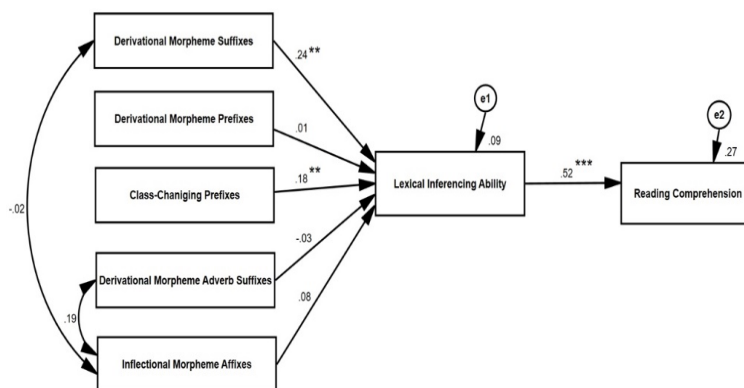
Chi-square = 21.032 ,df = 13, p=.072
CMIN/DF =1.618, GFI = .969, RMSEA = .056

1844

Figure 2 depicts the causal relationships among the dimensions of Morphological Awareness, Lexical Inferencing Ability, and Reading Comprehension. The model's robustness, as shown in Tables 4 and Figure 3, was tested with a sample size of 200. The statistical analysis indicated an acceptable model fit, with a non-significant chi-square statistic ($\chi2=21.032$, df=13, $\rho<0.072$).

Hypothesis 3: There is a significant difference in participants' satisfaction scores among different aspects of the teaching program. The satisfaction questionnaire was administered to assess participants' satisfaction (n=200) with four aspects of the teaching program: content, technique of using color coding, equipment and teaching program, and instructor. Data analysis was conducted using mean and standard deviation (S.D.) values. The results indicate that participants reported highest average satisfaction in the following areas: instructor's side (4.41), equipment and teaching program (4.23), content of learning the differentiation analysis of the meaning of words with word formation (prefixes and suffixes learning) (4.15), and technique of using color coding (4.06).

Discussion

Color coding is a valuable tool for enhancing morphological awareness, especially in individuals with reading difficulties. By highlighting different word parts in specific colors, learners can visually distinguish various components of complex words, uniting their meanings and syntactic functions. By using color coding, learners can quickly identify the morpheme's position and groupings within words, improving their reading fluency and comprehension; for instance, a student can use the color green for root words (e.g., bike), red for prefixes (e.g., sub-), and blue for suffixes (e.g., -tion). Thus, the student can easily decode and understand the meaning of the word "subdivision" by recognizing the color coding, breaking it into meaningful morphemes, and decoding each one. Such learning aids can be added to reading comprehension tasks, increasing students' morphological awareness significantly. Another advantage of color coding is that it can improve spelling skills. Students can use color coding to identify specific groups of letters that comprise either prefixes or suffixes and can be easily memorized. By using color coding in their learning process, students will have an easier time retaining their knowledge of word parts and meanings. Color coding is a powerful visual learning tool that can significantly enhance writing, reading comprehension, and morphological skills.

Hypothesis 1: This supports the hypothesis that teaching morphological awareness can improve reading comprehension. This finding aligns with previous research, such as Carlisle (2010) and Kuo

and Anderson (2010), who found positive effects of morphological awareness on reading comprehension. Nagy et al. (2014) also provided evidence for the unique role of morphological knowledge in reading development. However, some studies have not found significant effects of morphological instruction on literacy outcomes (McCardle et al., 2005), highlighting the need for further research. Overall, the study emphasizes the importance of considering morphological awareness in literacy interventions and calls for more research on effective instructional strategies.

The participants' pretest scores indicated a need for intervention in morphological awareness, while their practical test scores showed a moderate level of competence in lexical inferencing ability. The posttest scores revealed a need for further improvement in reading comprehension. The findings support the construction of the hybrid teaching model and its effectiveness, aligning with previous studies on morphological awareness and reading comprehension. The study by Yordchim and Gibbs (2014) supports the effectiveness of teaching morphological rules to improve vocabulary knowledge and reading comprehension. However, studies by Huang and Chou (2015) and Kim and Kwon (2015) found moderate effects of morphological instruction on vocabulary acquisition and reading comprehension. Nonetheless, the present study demonstrated the effectiveness of the hybrid teaching model, suggesting its practical value for educators in enhancing reading comprehension. Further research is needed to validate the generalizability of these findings to different populations and contexts.

Hypothesis 2: The study revealed significant effects of morphological awareness dimensions on lexical inferencing ability and reading comprehension, with derivational morpheme suffixes having the strongest direct impact. The findings highlight the importance of developing morphological awareness, particularly derivational morpheme suffixes, and lexical inferencing ability to enhance reading comprehension. As the study also identified lexical inferencing ability as a partial mediator between morphological awareness dimensions and reading comprehension, these results have implications for interventions targeting reading comprehension improvement.

Previous research supports the idea that readers can decompose written words into morphemes for accessing their meanings. Studies by Carlisle and Stone (2005), Deacon and Kirby (2004), and Nagy, Berninger, and Abbott (2006) emphasize the significance of morphological awareness in reading development and literacy outcomes. Goodwin and Ahn's (2010) meta-analysis demonstrate the positive impact of interventions aimed at enhancing morphological knowledge on literacy outcomes. However, Kuo and Anderson (2010) found language-dependent variations in the relationship between

morphological awareness and reading, and Lee's (2011) study in Korean revealed a weaker association between morphological awareness and reading comprehension compared to phonological awareness.

Overall, these studies indicate the importance of morphological knowledge in reading development and literacy outcomes, albeit with potential variations across languages. Rastle and Davis's (2008) study further supports the role of automatic decomposition of words into morphemes during reading. Further investigation is needed to explore the underlying mechanisms and factors contributing to the relationship between morphological knowledge and reading comprehension.

Hypothesis 3: The study aimed to assess the effectiveness and learner satisfaction of a hybrid teaching model that combines digital teaching aids and a morphological approach. Learner opinions indicated high satisfaction with various academic aspects, including the instructor, equipment and teaching programs, differentiation analysis of word meaning with word formation, and the use of color-coding. These findings suggest that the hybrid teaching model has the potential to enhance morphological awareness and improve reading comprehension.

Reliability analysis confirmed the consistency and stability of the measurement scales used in evaluating the hybrid teaching model's effectiveness, providing valuable insights into the reliability and internal consistency of the measurement instruments.

In the hybrid learning model, color coding is an effective tool that can be used to enhance morphological awareness in complex English words. Specifically, the color-coding technique involves the use of different colors to represent different morphemes or parts of a word. For instance, a prefix may be highlighted in green, a suffix in red, and the root word in black. The use of distinct colors in color coding helps learners easily identify different morphemes, which, in turn, improves their understanding of complex words and enhances their reading comprehension. Additionally, by using color coding, learners can easily identify and distinguish between different word parts and learn how to combine them to form a complete word meaning. Color coding can be used to promote active learning and classroom engagement. By integrating color-coded lessons into their instruction, educators can leverage visual cues to encourage participation and maintain learners' interests. The use of color coding in the hybrid learning model is an innovative approach that can significantly improve students' English morphological awareness and reading comprehension.

Effective vocabulary teaching involves developing learners' morphological awareness and understanding of how words are

formed through their morphemes. Morphological awareness training can enhance reading comprehension and promote the use of contextual clues to decode the meaning of unfamiliar words. One strategy teachers and facilitators may use to incorporate morphological awareness training into their vocabulary teaching is color coding. Color coding involves using different colors to highlight different morphemes in complex words. For example, teachers may use red to highlight prefixes and blue to highlight suffixes. This strategy helps learners visually distinguish and identify morphemes in complex words, making the process of decoding unknown words much easier. Another way to incorporate morphological awareness training is to use games and activities such as word building. This activity involved learners building words by combining different morphemes. This reinforces their understanding of morphemes and allows learners to practice using words in context. By incorporating morphological awareness training into vocabulary teaching strategies, teachers and facilitators can improve learners' reading comprehension and expand their vocabulary. Learners must possess a strong morphological awareness foundation to succeed in academic and everyday life.

The study conducted by Habes et al. (2021) demonstrates that the Microsoft Teams application is widely accepted by students for e-learning, positively influencing educational performance through its usability, ease of use, and usefulness. This study aligns with previous research by Akla (2021), Prihadi et al. (2021), Yordchim and Gibbs Jr. (2014), and Goodwin and Ahn (2010), which also highlight the positive impact of hybrid learning models and morphological approaches on student achievement and satisfaction. These studies collectively indicate improved academic performance, increased satisfaction, enhanced language skills, and positive effects on literacy outcomes when incorporating digital teaching aids, morphological instruction, and instructional strategies. The high satisfaction levels reported in Habes et al.'s study further emphasize the significance of instructional quality and appropriate resources, particularly the technique of using color-coding as a visual aid for word formation patterns, in facilitating effective learning experiences.

Collectively, these studies align with the current research findings, highlighting the potential of the hybrid teaching model and emphasizing the relevance and significance of incorporating morphological approaches and digital tools to enhance learning outcomes, satisfaction levels, and language skill development.

Conclusion

This study contributes to understanding the effectiveness of the hybrid teaching model in enhancing learner satisfaction and practical

significances. Future research should explore the long-term effects, conduct comparative studies, investigate diverse learner populations, explore pedagogical adaptations, assess transferability to other subjects, examine student engagement, and explore the impact of professional development programs. Addressing these research suggestions will advance our understanding of the hybrid teaching model's effectiveness and practical implications for enhancing learner satisfaction and practical significances.

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