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Using Adaptive Flipped Learning Model to Develop EFL Secondary Stage Students' Vocabulary Learning, Retention and Autonomy

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ABSTRACT

The present study sought to examine the efficacy of an adaptive flipped learning model in enhancing vocabulary acquisition, retention, and learner autonomy among first-year secondary school students. To fulfill this objective, a quasi-experimental research design was employed. Two equivalent groups (N = 30 per group) were selected purposefully based on the learning styles (verbal or visual). Each group included (15 verbal learners and 15 visual learners). The experimental group received instruction on Units 7, 8, and 9 through the adaptive flipped learning model, whereas the control group was taught using conventional instructional methods. To assess the targeted outcomes, the researcher administered a vocabulary pre-test, post-test, and delayed post-test, alongside a learner autonomy scale. The findings demonstrated statistically significant improvements in both vocabulary performance and autonomy among students in the experimental group. Furthermore, the experimental group outperformed the control group across all measured variables, thereby affirming the effectiveness of the adaptive flipped learning intervention.

Keywords:Adaptive flipped learning model - EFL vocabulary learning-retention –autonomy- secondary stage students.

المستخلص

سعت الدراسة الحالية إلى التحقق من فاعلية نموذج التعلم المقلوب التكيفي في تعزيز اكتساب المفردات، والاحتفاظ بها، والاستقلالية في التعلم لدى طلاب الصف الأول الثانوي. ولتحقيق هذا الهدف، تم اعتماد تصميم بحثي شبه تجريبي. تم اختيار مجموعتين متكافئتين عن قصد (عدد كل مجموعة = ٣٠ طالبًا) بناءً على أنماط التعلم (لفظي أو بصري)، حيث ضمّت كل مجموعة ١٥ متعلمًا لفظيًا و١٥ متعلمًا بصريًا. درست المجموعة التجريبية الوحدات الدراسية السابعة والثامنة والتاسعة المعدلة باستخدام نموذج التعلم المقلوب التكيفي، في حين تم تدريس المجموعة الضابطة باستخدام الأساليب التقليدية. ولتقييم النتائج المستهدفة، قامت الباحثة بتطبيق اختبار مفردات قبلي وبعدي واختبار بعدي مؤجل، بالإضافة إلى مقياس الاستقلالية في التعلم. وقد أظهرت النتائج تحسن ذات دلالة إحصائية في تعلم المفردات والاستقلالية لدى طلاب المجموعة التجريبية. علاوة على ذلك، تفوقت المجموعة التجريبية على المجموعة الضابطة في جميع المتغيرات المقاسة، مما يؤكد فاعلية التدخل القائم على التعلم المقلوب التكيفي.

الكلمات المفتاحية: نموذج التعلم المقلوب التكيُّفي– الاحتفاظ بالمفردات– الاستقلالية – طلاب المرحلة الثانوية

1.1. Introduction

Secondary education has a pivotal role in shaping students' EFL proficiency. In this context, the primary goal of language instruction is to foster the holistic language competence, equipping students with the necessary skills across all language domains to ensure they are well-prepared for university studies. Among these domains, vocabulary learning is a prominent factor in enabling students to comprehend texts, articulate thoughts clearly, and engage meaningfully in academic discussions. Without a strong vocabulary foundation, students may struggle with advanced reading comprehension, precise writing, and effective verbal communication, which are all critical for success in higher education.

Vocabulary learning is a cornerstone of effective language acquisition. According to Nation (2022) vocabulary is not an isolated component but rather an essential part of a broader linguistic system. Berger et al. (2022, p. 177) state that without a solid vocabulary base, EFL learners are unable to comprehend or express meaning effectively in either academic or real-life contexts. Milton & Hopwood (2022, p.84) stress that building a large vocabulary is crucial for second language success, as learners with more extensive vocabularies generally demonstrate greater language proficiency than those with limited vocabularies.

Adult learners, in particular, require at least (2,000) word families to engage in meaningful oral communication. Beyond this threshold, vocabulary development supports reading instruction, contributing significantly to both comprehension and fluency (Leon, 2023). Dabbagh et al. (2019) further demonstrated that the breadth and depth of vocabulary influence the quality of L2 students' writing. In addition, Berger et al. (2022, p. 177) stated that a rich vocabulary is also critical for academic achievement, professional communication, and lifelong learning.

Despite the prominent significance of vocabulary learning in EFL development, the current teaching practices indicate that vocabulary learning and retention represent a considerable challenge. Al-Qahtani (2015) and Afzal (2019) observed that many teachers rely on rote memorization techniques, such as bilingual word lists, which are often insufficient for meaningful language use. Nemati (2013) maintained that vocabulary retention could be difficult without strategic instruction. Other research by Ghanem (2018), Abdul Rahman et al. (2018), and Abd-Raboh (2019) identifies additional systemic issues including inadequate teacher preparation, diminished learner motivation, overly teacher-centered pedagogies, and insufficient assessment practices. Collectively, these findings suggest that traditional memorization techniques are largely ineffective, especially for adult learners, and advocate for more contextually

rich, learner-centered approaches that foster engagement and meaningful learning.

Vocabulary learning is not only influenced by instructional methods but also by the degree of autonomy support provided to learners. Autonomy support refers to the teaching practices that nurture students' sense of volition, ownership, and active involvement in their learning process (Daly, 2022). According to the self-determination theory, when students feel autonomous, they are more intrinsically motivated, which positively impacts their engagement and language learning outcomes (Vieira, 2020). Thus, while instructional methods provide the structure for acquiring vocabulary, it is the autonomy supportive practices, rooted in students' freedom to make choices, reflect, and self-regulate, that sustain motivation and deepen engagement.

In the EFL context, fostering learner autonomy has shown significant benefits for vocabulary learning. Recent studies have confirmed this connection in vocabulary learning. Masoudi (2017) found that when students were given choices in selecting vocabulary learning strategies and tools (e.g., mobile apps, flashcards, digital games), their motivation increased, leading to better vocabulary retention and usage. Similarly, Xodabande and Atai (2020) showed that EFL learners who participated in self-directed vocabulary learning activities, such as setting personal vocabulary goals, tracking progress, and using digital platforms, demonstrated higher vocabulary gains and greater long-term retention compared to those in teacher-led environments. Abad and Baradaran (2013), Haddada (2016) and Ibrahim and Alhodairy (2023) traced the relationship between learning autonomy and vocabulary learning strategies, results show that there was a positive correlation between learner autonomy and vocabulary learning strategies use in high proficient group, and a significant positive relationship between these two constructs in low proficient group.

Recent research has emphasized that digital learning environments that support autonomy, such as mobile-assisted vocabulary learning apps with self-paced features, contribute significantly to vocabulary growth and learner satisfaction (Guo, et al. 2022; Mohammed and Olwi, 2024). These findings suggested that integrating autonomy-supportive practices, such as goal setting, learner choice, feedback, and self-assessment, into vocabulary instruction may enhance both motivation and achievement. Therefore, supporting learner autonomy in vocabulary instruction is not only a pedagogical improvement but also a necessity. It is believed that promoting learner autonomy may transform vocabulary learning from a teacher-dependent task into a learner-driven process. When students are guided to take responsibility for their learning, set their own goals, and select effective strategies, they develop deeper vocabulary knowledge, greater motivation, and a lifelong ability to use language confidently and effectively.

The problem, therefore, lies not only in the students' vocabulary deficits but also in the lack of supportive instructional environments that foster autonomy. As a result, there is a pressing need to explore innovative instructional strategies that simultaneously enhance vocabulary acquisition and promote learner autonomy among secondary school students. Ghanem (2018) El-Maleh and Ramadan (2020) and Fakhry (2024) declared that learners, in EFL vocabulary learning context, often face issues such as low motivation, teacher-centered instruction, and ineffective assessment methods. As a result, adopting innovative and engaging vocabulary acquisition strategies has become increasingly important. Shah and Arinze (2023) proposed that with the integration of technology in education, new opportunities have emerged to enhance vocabulary learning. Students today are digital natives who use technology daily. The 21st century educational landscape has embraced e-learning tools and platforms that foster communication, collaboration, critical thinking, and autonomy. One of these innovative models is adaptive flipped learning.

A number of educational studies have proven that flipped learning contributes positively to various aspects of the educational process, such as increasing students' motivation to learn, improving academic achievement, developing various language skills, such as speaking, reading, and writing (Khan and Zulfiquar, 2022; Phoeun and Sengsri, 2021; Xiao et al., 2021). Zhou (2023) argued that flipped learning contributes to stimulating students' motivation and increasing their engagement in performing educational activities in the classroom, as they have previously reviewed the educational content in a manner that suits them. It also helps the teacher identify students who are struggling with learning, and thus focus and support them.

Chen and Hsu (2022) asserted that flipped learning can enhance student learning efficacy. However, various studies have identified limitations associated with flipped classrooms, particularly regarding the static nature of instructional content, which does not adapt to individual learner needs. In contrast, adaptive teaching, characterized by the customization of instructional delivery in response to students' unique requirements. In turn, this mitigates some of these shortcomings of the flipped learning model.

Kakosimos (2015) noted that flipped learning is an adaptive learning approach, as it allows students to review educational content at home, at their preferred time, and at their own pace, contributing to positive learning outcomes. Sayed et al. (2023) added that the adaptive learning environments, supported by intelligent systems and educational tools, allow for dynamic adjustments in the instructional process based on variables such as students' abilities, learning preferences, cognitive styles, prior knowledge, and preferred learning modalities.

Adaptive flipped learning environments are characterized by combining the characteristics of both flipped and adaptive learning, allowing for the benefits of each while overcoming their shortcomings (Eryilmaz and Ahmed, 2017). These hybrid models draw on the strengths of both approaches, flipped learning's flexibility and interactivity, and adaptive learning's personalization, while addressing the limitations of each. A number of studies have demonstrated the effectiveness of adaptive flipped learning in enhancing the educational process, such as increasing cognitive achievement, mathematical proficiency, motivation, and developing skills in using web applications (Chen and Hsu, 2022; Emam, 2020; Kuo and Chang, 2023).

In light of the reviewed literature, while previous studies have confirmed the general benefits of flipped and adaptive learning individually, this study reinforces the synergistic potential of their integration. By tailoring vocabulary learning experiences to students' learning styles and empowering them to take ownership of their learning, the adaptive flipped model may be a powerful instructional framework for EFL contexts. Consequently, the present study attempts to use adaptive flipped learning model to develop EFL vocabulary learning , retention and autonomy among first year secondary stage students.

1.2. Context of the problem

Vocabulary learning and learner autonomy are two critical prerequisites for successful language learning, particularly at the secondary stage level. However, empirical observations, as a supervisor of field training sessions, revealed that first year secondary school students often demonstrate low performance in vocabulary learning. Teachers frequently report that students struggle to comprehend and retain new vocabulary, which negatively affects their reading comprehension, writing, and overall English language proficiency. Despite the inclusion of vocabulary exercises in the curriculum, students show limited retention and fail to apply new vocabulary in authentic communication tasks. Vocabulary learning was treated as rote memorization rather than meaningful practice.

Furthermore, low performance in vocabulary learning is compounded by a lack of learner autonomy. The researcher observed that many students rely heavily on their teachers and traditional instruction methods, showing minimal initiative in learning new vocabulary independently or using available digital tools for self-study. Additionally, the students showed a limited engagement and lack of independent learning strategies, as observed through their reliance on teacher prompts, minimal participation in self-initiated tasks, and difficulty retaining vocabulary without repeated external reinforcement. This suggests a critical need for instructional models that foster vocabulary retention and learner autonomy through differentiated and student-centered approaches..

These observations were supported by vocabulary achievement test scores administered in El kharga administration secondary schools (n=3), where the majority of students (n=150) scored below the expected proficiency level (about 63% of the whole students), especially in the questions assessing contextual word meaning, use of synonyms and antonyms, affixation (prefixes and suffixes), and understanding of homophones and homographs. These areas, which require higher-order vocabulary processing and the application of words in meaningful contexts, revealed significant gaps in both retention and functional use. Such results indicated a reliance on surface-level memorization without deep comprehension or strategic vocabulary application.

To gain a deeper understanding of the factors contributing to students' low vocabulary achievement and lack of autonomy, semi-structured interviews were conducted with secondary stage English language teachers (n=11). The findings highlighted several key issues affecting vocabulary learning. One major concern was students' overreliance on translation methods, where they primarily translated words from English to Arabic without engaging in contextual or communicative use, which hindered their ability to apply vocabulary effectively in communicative context. Additionally, teachers noted a lack of exposure to varied learning strategies, as many students were unfamiliar with modern vocabulary techniques such as digital flashcards, mind mapping, and mobile learning apps. Another crucial factor was limited motivation and engagement, with students often perceiving vocabulary learning as a tedious task rather than an interactive and meaningful process. Furthermore, teacher-centered classrooms contributed to the problem, as traditional instructional approaches prevent students' ownership of their learning and hinder independent vocabulary-building habits. Finally, the insufficient integration of technology in vocabulary instruction was recognized as a challenge, despite students being digital natives. Teachers acknowledged that educational technology was underutilized, limiting opportunities for autonomous, engaging, and effective vocabulary learning experiences.

These findings highlighted a dual challenge: students' limited vocabulary knowledge and their weak capacity to manage and regulate their own learning which align with other studies that confirmed the weak performance of secondary stage students in vocabulary learning and autonomy (Alonazi, 2017; Ghanem , 2018; El-Maleh and Ramadan, 2020; Alrashidi,, 2022; Fakhry, 2024).

1.3. Questions of the study

The study attempted to answer the following questions:

- To what extent an adaptive flipped learning model would be effective in developing vocabulary learning ~~among~~ of EFL secondary stage students?

- To what extent an adaptive flipped learning model would be effective in developing vocabulary retention ~~among~~ of EFL secondary stage students?
- To what extent an adaptive flipped learning model would be effective in developing autonomy ~~among~~ of EFL secondary stage students?

1.4. Objectives of the study

The present study aimed to:

- Develop EFL secondary school students' vocabulary learning
- Develop EFL secondary school students' vocabulary retention.
- Develop EFL secondary school students' autonomy.

1.5. Significance of the Study

The present study is expected to provide students with an effective means to develop vocabulary learning, fostering a deeper understanding and retention. Additionally, it may encourage students to take ownership of their learning, gradually developing autonomous learning habits that are essential for academic success and lifelong learning.

The present study may provide teachers with an innovative instructional strategy that integrates technology and adapts to student differences. It may guide teachers to use an instructional model, in which they work as facilitators and mentors, allowing more time for individualized feedback, collaborative learning, and targeted support during class.

The results of the present study may draw EFL curriculum designers' attention to the significance of integrating adaptive learning technologies and flipped learning instructional model into the language curriculum. It pays the attention to the design of learner-centered curricula that emphasize vocabulary learning and use in context, rather than rote memorization. By embedding digital tools and adaptive content into instructional plans, curriculum designers may ensure a more flexible and effective learning experience aligned with modern pedagogical trends and students' digital literacy.

The study could contribute to the growing body of literature on adaptive learning, flipped classrooms, and vocabulary development. It fills a gap by specifically examining the intersection of these areas in the context of secondary education. It also opens avenues for exploring how adaptive systems can be scaled and applied across other language domains or educational levels.

1.6. Hypotheses of the study

1. There would be a statistically significant difference between the mean of scores obtained by the experimental group in the vocabulary learning pre-post test, favoring the post testing.
2. There would be a statistically significant difference between the mean of scores of the experimental group and that of the control group in the post test of vocabulary learning favoring the experimental group.

3. There would be a statistically significant difference between the mean of scores obtained by the experimental group in the vocabulary learning post and delayed test.
4. There would be a statistically significant difference between the mean of scores of the experimental group and that of the control group in the delayed test of vocabulary learning favoring the experimental group.
5. There would be a statistically significant difference between the mean of scores obtained by the experimental group in the autonomy pre-post scale, favoring the post testing.
6. There would be a statistically significant difference between the mean of scores of the experimental group and that of the control group in the post scale of autonomy favoring the experimental group.

1.7. Delimitations of the study

The present study was delimited to sixty first-year secondary school students in El kharga City, New Valley Governorate, during the second term of the academic year 2024-2025, with a focus on developing vocabulary learning, retention, and autonomy through the implementation of an adaptive flipped learning model.

2. Review of Literature

2.1. Vocabulary Learning and Retention

Nature

Vocabulary, in its most fundamental form, refers to the collection of words in a language. The Longman Dictionary of Contemporary English defines vocabulary as "the words that someone knows or uses, or all the words in a language, or all the words that are used in a type of language." This definition encompasses both the individual lexicon of language learners and the collective vocabulary of linguistic communities.

Academic literature provides more refined conceptualizations of vocabulary. Neuman and Dwyer (2009, p. 385) defined vocabulary as “words we must know to communicate effectively; words in speaking vocabulary and words in listening vocabulary.” Their definition highlights the communicative function of vocabulary and differentiates between spoken and listened vocabulary. Expanding the definition further, Lessard-Clouston (2013) argued that vocabulary includes not only individual words but also multi-word expressions, lexical chunks, and formulaic phrases that function as cohesive units, such as idioms, collocations, and fixed expressions. These elements contribute to native-like fluency and enable effective communication in contextually rich environments.

Nation (2022, p.18) underscores the dynamic and recursive nature of vocabulary acquisition, describing it as an integrative process involving various information sources and the development of communicative competence. He

notes that "Vocabulary learning involves the development of both receptive knowledge (recognition in listening and reading) and productive knowledge (use in speaking and writing), and is best achieved through a combination of direct teaching and incidental exposure" .

The ongoing nature of vocabulary acquisition is further reinforced by Alqahtani (2015, p. 24), who defines vocabulary learning as "a continuous process of acquiring new words and phrases, understanding their meanings, forms, and usage, and integrating them into one's mental lexicon for communication purposes." Webb and Nation (2017, p. 15) emphasize the incremental nature of vocabulary learning, stating that it requires repeated exposure and usage in diverse contexts to enhance word knowledge in terms of meaning, spelling, pronunciation, collocation, and grammatical behavior.

In the context of the present study, vocabulary learning is conceptualized as a systematic and active process through which language learners acquire, store, retrieve, and apply lexical items (words and phrases) to facilitate comprehension and effective communication. This definition recognizes vocabulary learning as an essential component of linguistic proficiency, crucial for achieving communicative competence and academic success.

Vocabulary Retention

Vocabulary retention constitutes a critical component of language proficiency, referring to the learner's ability to store, recall, and effectively apply lexical items over time. It plays a pivotal role in sustaining communication and enabling comprehension across diverse linguistic contexts. According to Hornby (2007), retention involves the act of keeping or holding information, thereby underscoring its relevance to cognitive and memory processes. Expanding this perspective, Tehseen and Hadi (2015) assert that vocabulary retention not only involves recall but also the contextualized use of previously acquired vocabulary. Barcroft (2015) emphasizes the significance of encoding conditions and retrieval practices, noting that meaningful engagement with vocabulary enhances the likelihood of long-term retention. In a similar vein, Schmitt (2019) further elaborates that successful retention is influenced by several variables, including frequency of exposure, the depth of cognitive processing, and the quality of the initial learning experience. Pawlak (2021) reinforces this view by defining retention as the durability of lexical knowledge, which entails maintaining form-meaning associations and ensuring the accessibility of vocabulary for appropriate communicative use.

In the context of EFL instruction, vocabulary retention is indispensable for learners to function effectively across academic and real-world communication scenarios. Empirical research has identified various factors that influence retention and emphasized the role of pedagogical strategies. For instance, Manzanera (2023) found that vocabulary embedded within

contextualized settings supported short-term retention, while multi-word units showed better long-term retention when presented in isolation. Conversely, Herusatoto (2019) demonstrated that rote learning through isolated word lists yielded stronger retention outcomes compared to context-based learning approaches. These contrasting findings highlight the complexity of vocabulary acquisition and the importance of selecting instructional methods aligned with learning goals and student profiles. Al-Lahham (2016) stresses the necessity for teachers to evaluate and adopt varied vocabulary teaching methodologies that promote effective retention and practical usage.

Given the multifaceted nature of vocabulary learning, it is essential to implement a structured and diversified instructional framework that incorporates repetition, contextual exposure, and retrieval-based activities. Such an approach not only enhances the retention of lexical items but also fosters their meaningful application, ultimately contributing to learners' linguistic competence and communicative autonomy in EFL settings.

The Central Role of Vocabulary in Foreign Language Acquisition

Vocabulary acquisition is widely recognized as a fundamental component of second language learning. A robust vocabulary base not only facilitates communication but also supports the development of the four core language skills: listening, speaking, reading, and writing. Heng (2011) asserts that extensive vocabulary knowledge is both crucial and highly desirable, as it significantly enhances learners' ability to comprehend and produce language across different modalities. Without adequate lexical knowledge, learners face considerable challenges in understanding input and expressing ideas effectively.

Several empirical studies have reinforced the link between vocabulary knowledge and overall language proficiency. Yao (2021), in a study involving Chinese EFL learners, found that vocabulary size was a significant predictor of performance in listening, reading, and writing tasks. Likewise, Kharaghani and Ghonsooly (2015) concluded that vocabulary knowledge was the strongest predictor of reading comprehension among Iranian EFL learners, emphasizing the necessity of a sufficient lexical foundation for reading success.

Kilic (2019) examined both vocabulary breadth (the number of words known) and depth (knowledge of collocations, word associations, and grammar) among Saudi EFL learners, finding that vocabulary depth had a stronger correlation with productive language skills such as speaking and writing. This suggests that possessing a large vocabulary, understanding how words function and relate to one another is essential for effective language use. Prior, et al. (2014) further elaborated on the importance of vocabulary by highlighting its role in enabling learners to infer the meanings of unknown words using contextual clues, particularly in foreign language settings where learners frequently encounter unfamiliar vocabulary.

In conclusion, vocabulary knowledge is not only integral to language comprehension and production but is also a strong predictor of academic success in EFL contexts. Its impact spans cognitive processing, reading comprehension, speaking fluency, and writing accuracy. As vocabulary continues to be a decisive factor in language acquisition, educators must implement evidence-based strategies that promote both the breadth and depth of learners' lexical knowledge from early stages onward.

2.2. Learner Autonomy

Nature

Learner autonomy refers to the learner's ability and willingness to take responsibility for their own learning by engaging in goal-setting, planning, monitoring, evaluating, and adjusting learning strategies. This involves making informed decisions about various aspects of the learning process, such as content, methods, resources, and assessment either independently or collaboratively. Originating from Holec's (1981) seminal definition, autonomy is defined as the "ability to take charge of one's own learning," which has since evolved to include cognitive, metacognitive, motivational, emotional, and social dimensions.

Several scholars have underscored the social dimension of autonomy. Palfreyman (2003) defined learner autonomy as the ability of students to work together, support one another, and share responsibility, including collaboration with teachers. Likewise, Little (2009) clarified that autonomous learners may choose to seek help or collaborate with peers; autonomy does not preclude interdependence. These perspectives reveal that autonomy can involve individual or collective agency, and that seeking guidance or engaging in peer collaboration is not inconsistent with autonomous behavior. Rather, the emphasis is on learners' willingness and ability to manage their learning proactively, whether independently or in social contexts.

Recent literature has moved toward more comprehensive and multidimensional definitions of learner autonomy. For instance, Dam and Legenhausen (2017) further defined autonomy as "The ability to engage in independent learning behavior by setting learning goals, monitoring progress, and self-evaluating outcomes." In addition, Teng (2019) defined it as "The learner's ability and willingness to plan, manage, and assess their own learning in both formal and informal learning contexts." This definition integrates motivation and self-regulation, recognizing that both ability and willingness are essential components of autonomous learning.

Vieira (2020) offered a holistic perspective, stating: "Learner autonomy is not merely self-instruction, but a multidimensional construct involving cognitive, metacognitive, emotional, and social engagement in learning." This view highlights the complexity of autonomy, which is supported by

psychological readiness, strategic thinking, emotional resilience, and social interaction. In line with this, Nguyen and Habók (2021) described learner autonomy as: "A multifaceted construct involving cognitive, metacognitive, motivational, and behavioral aspects that enable learners to take responsibility for their learning." This definition reflects a growing consensus that learner autonomy is best understood through an integrated framework, encompassing both internal processes and external behaviors.

In the context of the present study, autonomy is defined as a systematic process where learners gradually take responsibility for their own learning by setting goals, planning strategies, monitoring progress, evaluating outcomes, seeking help when needed, and applying knowledge independently across contexts.

Importance of Autonomy in Language Learning Context

In the evolving landscape of English as a Foreign Language (EFL) education, the traditional teacher-centered paradigm has gradually yealded to learner-centered approaches that prioritize student engagement, motivation, and learning responsibility. Central to this pedagogical shift is the construct of learner autonomy. According to Teng (2019), autonomy has a pivotal role in enhancing academic performance, promoting self-regulation, and fostering enduring language acquisition outcomes.

Learner autonomy transcends mere independence; it encompasses a complex array of psychological, cognitive, metacognitive, and strategic competencies (Dang, 2012). According to Khotimah, et al. (2019), autonomous learners are not only capable of making educational decisions but are also equipped to synthesize information, evaluate progress, and adapt strategies based on self-awareness. In this way, autonomous learners demonstrate a proactive attitude towards learning, choosing when, how, and what to study based on their individual goals and preferences. Such autonomy is not limited to isolated learning; rather, it thrives in interactive and collaborative environments where students may seek guidance and support from peers or instructors.

Research by Nguyen and Habók (2022) underscores the connection between learner autonomy and strategic language learning. Their findings among Vietnamese EFL students revealed that those who employed metacognitive and cognitive strategies, such as goal-setting, self-monitoring, and self-evaluation, achieved higher levels of language proficiency. This supports the notion that autonomy enables learners to act as strategic agents in their educational journey, rather than passive recipients of instruction.

A significant benefit of fostering learner autonomy lies in its capacity to enhance intrinsic motivation and self-efficacy. As Ushioda (2011) explains, when learners feel a sense of ownership over their educational decisions, they are more likely to find personal relevance in their tasks and invest effort in

completing them. This sense of control fosters deeper engagement, persistence, and the ability to overcome challenges—qualities that are especially valuable in EFL settings, where exposure to the target language may be limited.

Further evidence by Fazey and Fazey (2020) indicated that autonomous learners report higher levels of self-efficacy, a belief in one's capacity to succeed. In the EFL classroom, this belief translates into greater willingness to communicate, experiment with new language forms, and accept feedback constructively. These behaviors are instrumental in accelerating language acquisition and encouraging sustained learning beyond formal instruction.

Moreover, learner autonomy extends beyond the confines of the classroom. Autonomous students are more inclined to engage in supplementary language activities such as watching English-language media, using mobile applications, and participating in online communities. These self-initiated practices contribute to vocabulary growth, improved fluency, and heightened confidence, further reinforcing the interconnectedness of autonomy and language competence (Bajramia, 2015). In other words, autonomous learners are better prepared to adapt to changing learning environments, access diverse resources, and continue their development independently after formal instruction concludes (Benson, 2013). In a world where continuous skill development is essential, the ability to self-direct one's learning is not only beneficial but necessary.

Dimensions

Autonomy is not a monolithic construct; rather, it comprises multiple interrelated dimensions that together contribute to a learner's ability to manage and sustain language learning independently. Reviewing literature, (Little , 2009; Guo, 2011; Gamble, et al. 2012), there are five dimensions: cognitive, metacognitive, affective, social, and technical, which represent the core areas through which learners develop autonomy . The **metacognitive dimension** involves learners' ability to plan, monitor, and evaluate their learning processes. Through strategies like goal-setting and self-assessment, learners regulate their progress and make informed adjustments. The **affective dimension** addresses emotional aspects such as motivation, confidence, and attitudes. It influences how learners persist through challenges, view their learning experiences, and maintain engagement. The **cognitive dimension** relates to the mental strategies used to process language input, such as summarizing, inferring, or applying grammar rules, helping learners internalize and apply new knowledge effectively. The **social dimension** emphasizes the role of interaction, collaboration, and peer support in learning, acknowledging that autonomy includes both independent and interdependent engagement. Finally, the **technical dimension** highlights the use of digital tools and resources to personalize and extend learning beyond the classroom. Together, these

dimensions provide a comprehensive framework for understanding and fostering learner autonomy in EFL contexts.

To conclude**,** Learner autonomy is a dynamic, multifaceted construct that has a critical role in language learning. Its dimensions: metacognitive, affective, cognitive, social, and technical, interact to shape learners' capacity to plan, manage, evaluate, and sustain their learning processes. Each dimension contributes uniquely to learners' ability to navigate linguistic challenges, reflect on their progress, and engage meaningfully with content and community. To foster autonomy, educators are advised to move beyond directive teaching and create environments where learners can set goals, make decisions, reflect on outcomes, and collaborate meaningfully. Curriculum designers should integrate autonomy-supportive frameworks that combine explicit strategy instruction, flexible resources, and continuous support. In doing so, they will empower learners to become confident, independent, and capable language users who are equipped to navigate the complexities of language learning in an interconnected and ever-changing world.

2.3. **Adaptive Flipped Learning Model**

Definitions

Adaptive flipped learning is characterized by combining the characteristics of both flipped and adaptive learning, allowing for the benefits of each while overcoming their shortcomings (Eryilmaz and Ahmed, 2017). In the educational literature, flipped learning is defined as an educational method based on changing the prevailing sequence of the learning process; educational content is presented outside the classroom, while homework and task completion take place inside the classroom (Chen et al., 2021). It is also defined as a model of student-centered learning that aims to make the classroom more active and student-centered by engaging students with their peers in participatory and collaborative activities such as discussion sessions, problem-solving, and brainstorming (Birgili et al., 2021).

Adaptive learning is defined as the utilization of digital platforms to create individualized learning trajectories (MacArthur, Metsala, and Shankweiler, 2016). These platforms employ advanced learning analytics to modify instructional material in real time, thereby promoting a personalized and effective learning environment (Yilmaz, 2017). Guralnick (2024, p. 305) further characterized adaptive learning as an e-learning model that enhances educational flexibility by accommodating learner variability. This model systematically modifies the learning environment to correspond with students' inclinations, interests, and proficiency levels, ultimately fostering improved academic performance. Additionally, it seeks to mitigate challenges inherent in

e-learning platforms that conventionally deliver uniform content without accounting for learner diversity.

Adaptive flipped learning is a model that synthesizes the pedagogical benefits of flipped learning with the personalized approach of adaptive learning technologies. This hybrid framework accommodates diverse learner needs, fosters autonomy, and improves academic performance by integrating pre-class content engagement with dynamic, interactive in-class applications (Ruiz, 2025, p. 14). Given the rising prevalence of digital and differentiated classrooms, adaptive flipped learning has emerged as a compelling instructional model for contemporary education.

Ruiz (2025) defined **adaptive flipped learning** as an instructional strategy wherein learners engage with pre-class content through adaptive platforms that tailor content delivery based on individual learning needs. During in-class sessions, educators leverage this personalized foundation to facilitate collaborative, higher-order thinking activities. Similarly, Chen and Hsu (2022) conceptualize adaptive flipped learning as *"a learner-centered instructional approach wherein adaptive technologies enable differentiated pre-class preparation, while in-class time is devoted to personalized and collaborative learning experiences."*

Eryilmaz and Ahmed (2016) further elaborate on the nature of adaptive flipped learning, describing flipped learning as a contemporary instructional model that is complemented by **adaptive learning environments**, innovative frameworks that personalize teaching by developing individualized learner profiles based on their preferences, areas of interest, and academic objectives. Prior to course enrollment, students undergo an **evaluation assessment** to determine their baseline knowledge, thereby ensuring that subsequent instructional materials align with their competencies. Through this model, students are empowered to engage with course materials autonomously prior to in-class instruction, utilizing individualized learning modalities to optimize comprehension and retention.

The adaptive flipped learning framework consists of two distinct levels that cater to varying learner needs and competencies. The Foundational Level serves as the entry point for instruction, presenting core concepts and introductory materials that establish a baseline understanding. This stage ensures that all learners acquire fundamental knowledge before progressing. The Advanced Level, in contrast, delivers more sophisticated and specialized content, tailored to individual learners' needs and cognitive abilities(Ruiz, 2025). By incorporating adaptive techniques, this higher-tiered level refines instructional delivery, optimizing engagement and comprehension through personalized learning pathways. Together, these two levels create a dynamic

instructional model that facilitates differentiated learning, fosters autonomy, and enhances overall academic performance.

In the context of the present study, **Adaptive Flipped Learning** is defined as a **teaching model that blends pre-class digital learning with in-class active learning, while tailoring content and support based on learners' individual needs, progress, and preferences**. It combines the personalization of adaptive learning systems with the communicative, interaction-rich environment of flipped classrooms, promoting both language competence and learner autonomy.

Theoretical Foundations of Adaptive Flipped Learning

Adaptive flipped learning is anchored in several educational theories that emphasize student autonomy, engagement, and cognitive development. Central to its framework is **constructivism**, which posits that learners actively construct knowledge by integrating new information with prior understanding(Fosnol, 2013). In the adaptive flipped learning, students assume responsibility for their learning by reviewing instructional content independently before classroom engagement and collaborating with peers to reinforce comprehension. One of the core principles of constructivism asserts that learning occurs when students assimilate new knowledge into their existing cognitive structures(Cheng et al., 2019).

Adaptive flipped learning aligns with this principle by facilitating the gradual integration of pre-class knowledge with in-class application, thereby enhancing comprehension and retention. Moreover, constructivist theory highlights the necessity of direct participation in the learning experience, advocating for creative, interactive engagement through discussions, project-based tasks, collaborative exercises, problem-solving activities, and role-playing (Tunggyshbay et al., 2023).

Additionally, **social constructivist theory** underscores the role of peer interaction in knowledge construction (Kiraly, 2014). In a flipped learning environment, students engage in collaborative learning experiences, such as structured discussions, role-playing simulations, and cooperative activities, which foster deeper comprehension and intellectual exchange (Kuo and Chang, 2023) .

From a cognitive perspective, adaptive flipped learning incorporates principles from **cognitive learning theory**, which emphasizes learner agency in both individual and collaborative learning processes (Harasim, 2017, p. 49). This model aligns closely with Vygotsky's Zone of Proximal Development (ZPD**)**, which suggests that students achieve greater learning outcomes when receiving appropriate guidance within their developmental capacity. Flipped learning facilitates this process through peer-assisted activities, where students operating within their ZPD receive support from more proficient learners,

thereby optimizing educational effectiveness (Erbil, 2020). Moreover, **cognitive load theory** has a crucial role in adaptive flipped learning by mitigating cognitive overload. By distributing learning across distinct phases, pre-class preparation, interactive classroom engagement, and post-class reinforcement, students are afforded sufficient time to process information systematically, thereby reducing the cognitive burden associated with content complexity (Gao and Hew, 2023).

As a model of blended learning, adaptive flipped learning also aligns with Bruner's learning theory, which advocates for differentiated instruction based on students' individual needs and cognitive capacities. This model ensures accessibility by tailoring instructional content to diverse learner profiles, accommodating varying learning styles and preferences. It further empowers students with autonomy, allowing them to select the learning activities most suited to their abilities and developmental potential (Lawter and Garnjost, 2023).

Building on these theoretical perspectives, the researcher has designed a student-centered flipped learning model that systematically structures educational objectives from foundational to advanced levels. The proposed framework integrates procedural formulation of learning outcomes, active social interaction, and constructive feedback mechanisms to enhance engagement. By centering instruction on learner autonomy, the adaptive flipped model facilitates individualized learning trajectories while ensuring support from both peers and educators, either through integrated communication tools or structured classroom collaboration.

Phases of Teaching in the Adaptive Flipped Learning Model

The adaptive flipped model of teaching comprises several interconnected stages that aim to enhance individualized learning and collaborative engagement while integrating adaptive technologies for continuous instructional refinement (Emam, 2020 ; Chen and Hsu, 2022; Kuo and Chang, 2023).

The first stage, pre-class adaptive preparation, involves the individualized learning phase, wherein learners engage with personalized educational materials tailored to their cognitive levels, prior knowledge, and learning preferences. This approach fosters self-paced learning and ensures differentiated exposure to content. To facilitate this process, AI algorithms and Learning Management Systems (LMS) dynamically adjust the difficulty level and format of instructional materials based on learners' profiles and responses, thereby optimizing their preparatory engagement.

Following the preparatory phase, the In-Class Active Application stage is designed as a collaborative learning experience, where students actively participate in peer-supported problem-solving, discussions, and application exercises related to the pre-learned material. In this phase, the instructor

assumes the role of a facilitator, providing targeted scaffolding informed by real-time diagnostic insights. A distinctive adaptive feature of this stage is the dynamic grouping of students, which is systematically adjusted according to individual learning gaps and pacing, thereby fostering a more effective and responsive collaborative environment.

After the in-class engagement, the Post-Class Reinforcement and Reflection phase is focused on deepening students' comprehension through personalized feedback, self-assessment, and strategic reinforcement. LMS systems track learners' performance and recommend follow-up tasks or remedial materials to address specific areas of improvement (Sayed et al., 2023). The overarching objective of this phase is to support long-term retention and cultivate learner autonomy through structured metacognitive reflection, thereby reinforcing students' ability to evaluate and regulate their own learning progress.

The final and continuous stage of the model, Continuous Monitoring and Adjustment, functions as an ongoing evaluation mechanism throughout the instructional process. Both teachers and system-driven analytics play a pivotal role in refining curriculum design and instructional strategies based on collected learning data. Educators act as data-informed decision-makers, continuously revising pacing, grouping dynamics, and instructional materials to align with evolving student needs. To support this adaptive process, AI-powered dashboards and learning analytics tools are integrated for real-time monitoring, ensuring that adjustments are evidence-based and effectively responsive to learners' developmental trajectories (Kuo and Chang, 2023).

Through these interconnected phases, the adaptive flipped model establishes a dynamic and data-driven instructional framework that enhances both individualized and collaborative learning experiences while leveraging advanced adaptive technologies for continuous pedagogical refinement.

Nature and Pedagogical Value of Adaptive Flipped Learning

Adaptive flipped learning represents a transformative approach to education, combining the personalization of adaptive learning technologies with the engagement of the flipped classroom model. For the benefits of flipped leaning in EFL context, empirical studies support the positive impact of flipped classrooms on various language skills. Santanasamy and Yunus (2022) emphasized that flipped learning contributes to improving students' communication skills by reinforcing knowledge through practical application. They further underscore its role in making educational materials more accessible, promoting the integration of technology into pedagogical practices, and bridging experiential learning with classroom instruction. Furthermore, flipped learning fosters collaboration and interaction among students, particularly in language acquisition contexts, as it encourages peer feedback

during speaking activities, ultimately enhancing oral proficiency (Davari and Mall-Amiri, 2022; Luan et al., 2023; Sheerah and Yadav, 2022). Through these combined advantages, flipped learning emerges as an effective instructional framework that supports autonomous learning, facilitates differentiated instruction, and enhances pedagogical efficiency.

Karimi and Hamzavi (2017) found significant gains in reading comprehension among Iranian EFL learners, while Amiryousefi (2017) reported improved listening skills in university students using flipped learning. Similarly, Challob (2021) observed enhanced writing skills among Iraqi EFL learners, attributing success to the supoortive learning environment, extended learning time, and support from peers and instructors. In the domain of speaking, Koroglu and Cakir (2017) demonstrated substantial improvement in Turkish students' oral proficiency due to increased in-class practice and peer collaboration.

Further supporting these findings, Putro et al. (2023) demonstrated that the personalized nature of adaptive content delivery and the collaborative in-class environment were credited with fostering deeper learning and critical thinking. Additional research by Suyantiningsih et al. (2021) confirmed that adaptive systems enhance the effectiveness of the flipped model by allowing for targeted, differentiated instruction that meets students where they are. Furthermore, the model maintains a balance between automated personalization and human-centered pedagogy. It is also inherently responsive, with instructional materials and pacing adjusted based on real-time learner feedback and performance data. This iterative process makes the classroom an interactive ecosystem in which learners, content, and instructors engage in continuous adaptation (Eryilmaz and Ahmed, 2017).

Adaptive flipped learning supports the development of both cognitive and non-cognitive skills. As learners engage with personalized pre-class content and in-class collaborative tasks, they enhance not only their knowledge acquisition but also their communication, collaboration, and problem-solving abilities. This approach builds learners’ self-efficacy and fosters a deeper sense of ownership over their learning (Chen and Hsu, 2022). The structure also supports learning flexibility and accessibility. With the rise of AI-powered learning platforms and LMS tools, students can engage with materials at their own pace, revisit challenging concepts, and access support beyond the traditional classroom, making education more inclusive and scalable (Santoso, 2010; Raharjo, 2021).

A growing body of empirical research highlights the effectiveness of adaptive flipped learning in improving academic performance and motivation. For instance, Eryilmaz and Ahmed (2017) compared two English language learning environments for elementary students: one using an adaptive flipped model and the other using a non-adaptive model. The adaptive group showed

significantly higher gains in vocabulary and grammar retention, attributed to multimedia tools, gamified assessments, and continuous feedback that increased learner engagement. Similarly, Kakosimos (2015) identified several benefits of adaptive flipped learning, including enhanced motivation, more flexible learning environments, and more targeted teacher support.

This model also promotes learner autonomy. In flipped environments, students are expected to engage with content before class, developing habits of self-direction and accountability. When this is combined with adaptive systems that respond to individual progress, learners become more involved in setting goals, tracking their understanding, and revising their strategies. Such practices not only improve academic outcomes but also equip students with lifelong learning skills necessary for success in the 21st century (Handayani, 2021; Wardana and Setiawan, 2020).

In summary, adaptive flipped learning offers an effective, student-centered alternative to traditional instruction by blending the strengths of technology with human facilitation. It personalizes learning pathways, encourages active classroom engagement, and fosters autonomy, critical thinking, and collaboration. As digital tools continue to evolve, this hybrid model is well-positioned to meet the complex demands of modern education, particularly in language learning. Embracing adaptive flipped learning can significantly enhance learner motivation, achievement, and equity, making it an essential component of innovative educational reform.

Learning Styles Adaptation

Understanding students' learning styles is a crucial aspect of effective pedagogy, as it significantly influences learning outcomes, enhances motivation, and enables educators to employ appropriate instructional strategies. By identifying individual learning preferences, teachers gain deeper insights into students' cognitive processes, including how they perceive, process, and retrieve information. This awareness facilitates the implementation of tailored support mechanisms, ultimately optimizing the learning experience (Al-Eid, 2023). Moreover, recognizing students' learning styles allows educators to assess their abilities, potential, and unique characteristics, which serve as foundational elements for designing effective instructional strategies that foster engagement and motivation.

The role of learning styles extends beyond individualized instruction to broader educational and social dimensions. Research has demonstrated that learning styles contribute to improved academic performance, reduced individual differences among students, and the development of targeted interventions to address learning challenges (Troussas et al., 2023; Zeybek, 2020). For instance, Gilakjani (2021) found that Iranian EFL learners exhibited

increased motivation and engagement when instructional activities aligned with their dominant learning preferences, leading to greater classroom participation.

Furthermore, understanding one's learning style is instrumental in fostering learner autonomy. When students are aware of their optimal learning approaches, they can select strategies, tools, and resources that align with their cognitive preferences. Reinders and White (2016) highlight that encouraging learners to reflect on their learning styles and adapt their study habits accordingly enhances metacognitive awareness and facilitates long-term academic success. This is particularly relevant in EFL contexts, where independent language practice outside the classroom is often necessary. AlQahtani and Al-Otaibi (2020) further underscore this notion, demonstrating that visual-verbal blended instruction positively impacts vocabulary acquisition among EFL learners.

In conclusion, it is imperative that educators identify students' preferred learning styles to design instructional methodologies that align with their cognitive tendencies, experiences, and information-processing mechanisms. By integrating personalized educational strategies, teachers can enhance student engagement, motivation, and overall academic achievement. This study adopts Felder and Silverman (1988) with a specific focus on the visual/verbal dimension, recognizing its critical role in shaping instructional effectiveness.

Visual Learners versus verbal learners

Visual learners rely on imagery and spatial awareness to process and retain information effectively. They engage best with educational content presented through images, diagrams, charts, graphs, and videos. Students with a visual learning preference depend on their sight and visual memory, often favoring instructional materials that include drawings, shapes, maps, and structured visuals projected via different mediums. They typically prefer sitting at the front of the classroom to minimize distractions, ensuring unobstructed access to visual aids (Kamińska, 2014, p.32). Furthermore, visual learners exhibit a strong ability to interpret and recognize patterns, remembering faces well and organizing their surroundings methodically. They also take meticulous notes, reinforcing their comprehension by translating information into a structured visual format (Robinson, et al. , 2022, p.22).

Research suggests that visual learners benefit significantly from engaging with animated content, slides, charts, and educational videos. They respond well to materials enriched with visual representations, such as films, interactive images, and textbook illustrations. Several instructional strategies have proven effective for visual learners, including the use of illustrations and charts to depict key relationships, sequences, and details. Presenting content through videos and interactive visual media enhances comprehension and engagement. (Chicho and Zrary, 2022; Ocampo et al., 2023).

By contrast, verbal learners prefer to receive and process information through spoken or written language. They excel when concepts are articulated through oral discussions, lectures, and written explanations. This learning style emphasizes linguistic processing, wherein students demonstrate a strong capacity for auditory and textual comprehension. Verbal learners thrive in discussions, engage actively in conversations, and exhibit proficiency in absorbing information presented through speech and written narratives (Robinson, et al. , 2022).

To optimize instruction for verbal learners, educators can integrate strategies that emphasize linguistic engagement. Discussion-based learning, where students are divided into small groups to exchange ideas on specific topics, fosters interaction and cognitive development (Kamińska, 2014). Additionally, utilizing audio recordings encourages fluency and builds students' confidence in verbal communication. By recording spoken reflections on assigned topics and receiving constructive feedback, students refine their articulation skills while teachers identify strengths and areas for improvement (Candilas et al., 2023; El Aissaoui et al., 2019).

Based on the previous, review, it could be concluded that vocabulary development and learner autonomy are fundamental components of successful EFL learning. A rich vocabulary empowers students to comprehend, express, and engage meaningfully with texts and conversations, while autonomy fosters learners' ability to take charge of their own progress, apply strategies, and maintain motivation beyond the classroom. To overcome the challenges of developing both autonomy and vocabulary learning, adaptive flipped learning could emerge as a promising approach to supporting both vocabulary acquisition and learner autonomy. By shifting direct instruction outside the classroom and personalizing learning pathways based on students' learning styles, this model allows learners to engage with vocabulary at their own pace and revisit content as needed. In-class time is then used for interactive, task-based applications that reinforce vocabulary through use, collaboration, and teacher support. This blend of self-regulated online preparation and adaptive, learner-centered classroom practice creates a conducive environment for deep vocabulary learning and promotes the skills and mindset necessary for autonomous learning.

3. Method

3.1. Design

To achieve the aim of the present study, the researcher adopted the quasi-experimental design (a pre-post control group design). An experimental group and a control one were exposed to pre-posttests in vocabulary and autonomy. The experimental group was instructed through the adaptive flipped learning

model, while the control group received regular procedures of instruction as stated by the Ministry of Education. Three units were selected from New Hello 1 term 2 in the academic year 2024-2025 to be instructed using the adaptive flipped learning model, as these units were rich of vocabulary items.

3.2. Participants

Sixty participants from first year secondary school students were selected purposefully after administering the Fielder and Silverman (1988) standardized scale of learning styles on (210) female students at El kharga secondary school for girls, at El kharga city, New Valley governorate. The administration revealed that a number of (122) were considered visual learners whereas (88) were verbal learners. Of these students , (60) students were chosen and distributed into two equivalent groups. thirty students participated in the experimental group and the other thirty students were in the control group. The age of the participants ranged from (16 to 17) years old. Their English proficiency level was equivalent approximately according to their grades in the final EFL exam.

3.3. Instruments and Materials

3.3.1. Instruments

A. Vocabulary learning pre- pos test

Objective of the test:

The test aimed at assessing the experimental group's learning of new vocabulary before and after being instructed through adaptive learning model and to compare their performance to that of the control group in order to explore the effectiveness of the adaptive flipped learning-based instruction.

Procedures of Designing the Test:

In order to design a comprehensive vocabulary achievement test aligned with the instructional goals of *New Hello 1*, *Term 2* textbook for secondary stage students, a thorough content analysis was conducted for Units 6, 7, and 8. This analysis aimed to extract the key vocabulary items embedded within the units and classify them according to essential vocabulary learning skills, including: using synonyms, using antonyms, word definitions, using prefixes and suffixes, identifying homophones and homographs, recognizing analogies, understanding word meanings, and analyzing word roots. Based on this classification, the number of test items allocated to each skill was determined proportionally to its content weight within the textbook. As a result, the test comprised fifty multiple-choice questions distributed as follows: using synonyms (4 items), using antonyms (4 items), word definitions (8 items), using prefixes (6 items), using suffixes (6 items), homophones (4 items), homographs (4 items), analogies (4 items), word meanings (8 items), and word roots (2 items). The test was accompanied by a table of specifications, detailed instructions for

administration, time allocation, scoring criteria, and clear guidelines for test-takers. Each correct response was awarded one point.

Test validity

To determine the validity, appropriateness, and suitability of the test, it was submitted to a jury of EFL teachers, supervisors and EFL specialists who approved its suitability and clarity.

Piloting the test

To ensure the reliability of the vocabulary learning test, a pilot study was conducted on a sample of twenty-five students out of the main study groups. The purpose of this piloting phase was to examine the psychometric properties of the test. First, the reliability of the test was calculated using the Cronbach Alpha formula, yielding a high reliability coefficient of 0.847. Second, the difficulty (facility) indices for the items ranged between 0.35 and 0.45, values that fall within the acceptable range, confirming that the test was appropriately challenging for the target population. Third, the discrimination indices were calculated using the Extreme Groups method, comparing the top 27.5% of scorers with the bottom 27.5%. The results indicated that all items had suitable discrimination indices, ranging from 0.30 to 0.55, demonstrating the test's ability to effectively distinguish between high and low performers. These findings collectively support the reliability and validity of the test as a tool for assessing vocabulary learning. Finally, the time taken by each student was recorded and divided by the total number of students. Answering the test items lasted 50 minutes.

B. Learner's autonomy pre- post scale

Purpose:

The autonomy scale was developed to assess the autonomy level of first-year secondary school students in learning EFL prior to and after being instructed through the adaptive flipped learning model. Its purpose extended to compare the autonomy of both the control and experimental groups, providing insights into the effectiveness of the instructional model on the students' overall autonomy in EFL learning. Based on reviewing the literature and previous studies of learner's autonomy, the researcher designed a 5- Likert scale of (29) items distributed over 5 dimensions namely, cognitive, metacognitive, social , affective and technical.

Face validity:

The scale in its initial form was exposed to a jury of specialists in English language methodology , EFL teachers and supervisors and educational psychology. The items of the scale were modified linguistically according to their recommendations.

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Piloting the scale

The scale was applied to (25) participants out of the study groups to verify the internal consistency and reliability of the scale.

A. Internal consistency: the correlation coefficient between the item and the total score of the scale ranged between (0.70 and 0.94).

Table (1)

No.	Correlation coefficient	No.	Correlation coefficient	No.	Correlation coefficient
١	.63	١١	.50	٢١	.55
٢	.58	١٢	.49	٢٢	.66
٣	.66	١٣	.56	٢٣	.51
٤	.53	١٤	.60	٢٤	.58
٥	.50	١٥	.64	٢٥	.62
٦	.59	١٦	.54	٢٦	.57
٧	.69	١٧	.67	٢٧	.60
٨	.48	١٨	.53	٢٨	.59
٩	.57	١٩	.52	٢٩	.63
١٠	.60	٢٠	.61	-	-

The results in the previous table indicated that **all items were statistically significant, (0.05).** The **Pearson correlation coefficients** ranged between (**0.43 and 0.69),** confirming the **consistency of all items** in measuring the intended objectives.

Scale Reliability: A re-test of the scale two weeks after the first administration was conducted and the correlation coefficients were calculated; it was 0.78. Cronbach's alpha coefficient (a =.76). It is clear from the pilot study that the scale of learner's autonomy achieves a high degree of validity, reliability, and internal consistency

Scoring the scale

The participants of the study responded to the scale using a 5- likert levels ranged from strongly agree to strongly disagree. These responses were coded to scores as strongly disagree was given (1) score, disagree (2 scores), moderately (3 scores), agree (4 scores) and strongly agree (5 scores). The maximum score of the scale was (145) and the minimum score was (29).

3.3.2. Material of the Study

The instructional material based on the adaptive flipped learning model, was designed to enhance first-year secondary stage students' vocabulary learning, retention, and autonomy. The design process followed a systematic set of procedures which were outlined as follows:

Content Analysis and Vocabulary Selection: The researcher conducted a thorough analysis of the first three units of the *New Hello! 1 – Term 2* textbook to identify the key vocabulary items in each unit. This analysis served as the foundation for the selection of vocabulary, which was tailored to the students' proficiency level and learning objectives. Key vocabulary items were selected for each lesson, ensuring that they were relevant to the unit topics and suitable

for students' comprehension levels. Grammar structures and functional expressions necessary to communicate effectively using the selected vocabulary were included. The content analysis revealed that the main topics of units 7, 8, and 9 in the textbook were *Health and Safety, Robots, and Good Education*.

Table (2)
Content of the Material

Units	lessons	Vocabulary focus
Health and Safety	6	Common illnesses and health problems (e.g., headache, stomachache, cold) First aid and safety rules Healthy habits (e.g., washing hands, eating vegetables, getting exercise) Modal verbs for giving advice (e.g., should, shouldn't) Expressions related to emergencies (e.g., call the doctor, stay calm)
Robots	6	Types of robots (e.g., cleaning robots, rescue robots, space robots) Actions and abilities (e.g., carry, help, detect, fly) Describing functions and roles of robots Future-oriented modal verbs (e.g., will, can) Jobs and activities that robots can do
A Good Education	6	School subjects and learning environments Characteristics of a good teacher/student School facilities and equipment Expressions related to learning and school life (e.g., take notes, revise, do your homework) Values and responsibilities in education (e.g., punctuality, respect, teamwork)

Selecting the Online Resources:

Online resources that aligned with the target learning styles of the students were selected. The content was developed based on the identified target vocabulary and learning objectives for each unit. Once the materials were ready, they were uploaded to the online learning platform (Google Classroom). Each material was categorized and tagged according to the lessons of each unit and the type of learning activity to suit either "visual learners," or "verbal learners,".

- **For visual learners:** A variety of visual materials, such as videos, infographics, and mind maps, were selected to support visual learners in their vocabulary acquisition. These resources were carefully aligned with the selected vocabulary and contextual themes to ensure that the content was engaging and accessible.
- For verbal learners, resources such as podcasts, audio clips, and dictation tasks were integrated into the instructional material. These auditory activities were designed to reinforce vocabulary understanding through listening, pronunciation, and contextual use.

Determining the in class activities

The in-class activities were designed to reinforce the vocabulary students had been exposed to during the online phase, using differentiated tasks that promoted collaboration, application, and reflection. These activities aimed to activate prior knowledge, deepen understanding, and provide structured opportunities for students to use vocabulary in meaningful contexts.

Description of the instructional material:

The instructional material consisted of three units derived from the official *New Hello! 1* curriculum (Second Term) used in the Egyptian secondary stage. Each unit comprised six lessons, and the content was adapted and expanded through the lens of adaptive flipped learning to support vocabulary acquisition, retention, and learner autonomy.

The practices and drills incorporated into the learning process focused on various aspects of vocabulary learning, emphasizing including identifying word roots, working with prefix and suffix combinations, and engaging in vocabulary puzzles and crosswords. Additionally, students practiced homophone selection within sentence contexts, categorized words by part of speech, completed sentences using target vocabulary, and rearranged jumbled definitions. Matching synonyms and antonyms, fill-in-the-blank exercises, and true/false vocabulary checks further reinforced their understanding of word forms.

Meaning-based practice allowed students to apply their vocabulary knowledge in context. They engaged in sentence writing using newly acquired words, matched definitions with visuals or scenarios, and completed paragraphs to solidify comprehension. To enhance contextual use, students participated in role-playing activities incorporating unit vocabulary, searched for words within short texts in vocabulary scavenger hunts, and explored analogies and categorization games to deepen their linguistic connections.

Retention and autonomy tools were also integral to the learning framework, supporting students in maintaining vocabulary proficiency and fostering independent learning habits. Vocabulary journals provided a structured space to document definitions, examples, and reflections, while self-assessment checklists helped track learning progress. Peer teaching activities, such as “teach the word” challenges, encouraged collaboration and reinforced vocabulary knowledge through student-led instruction. Altogether, this blend of adaptive content delivery, including flipped learning and task-based classroom interaction, ensured both a deeper understanding of vocabulary and long-term retention, while simultaneously fostering student autonomy and motivation in language learning.

Teachers monitored students’ engagement during these lessons, provided scaffolding where needed, and ensured that each student had opportunities to

practice vocabulary through their preferred modalities. The teacher provides real-time feedback on pronunciation, word usage, and grammar, using observation checklists to guide personalized support.

Procedures of Teaching

Adaptive flipped learning model unfolds across three interconnected phases:

In the **Pre-Class Phase**, students begin their learning journey by accessing an adaptive online platform at their own pace, allowing them to interact with materials that align with their preferred learning styles. They complete a range of pre-class activities that geared toward reinforcing initial vocabulary exposure. In addition, students set personal learning goals, such as mastering a set number of words, and record newly acquired vocabulary in a digital log that includes definitions and contextual examples.

The in-class phase shifts the focus to active, collaborative practice, where vocabulary is applied in meaningful contexts. The teacher initiates each lesson with a warm-up review or a formative mini-quiz, reinforcing pre-class learning and preparing students for differentiated group activities based on learning styles. Various instructional strategies are employed to facilitate vocabulary use.

The post-class phase: The teacher provides tailored reflection prompts, encouraging students to evaluate which activities helped them retain vocabulary most effectively. Extension tasks are assigned based on individual proficiency levels, requiring students to integrate newly learned words into creative dialogues or written exercises. Progress is continuously monitored through vocabulary journals and Google Classroom activities, allowing the teacher to send personalized feedback. Students, in turn, take responsibility for reviewing and updating their vocabulary logs, adding new examples and annotations to deepen their understanding. They may complete additional enrichment tasks, such as writing stories or designing peer quizzes, while also tracking their progress and setting new learning goals.

Piloting the instructional material

Before making the materials available to participants, the researcher conducted a thorough review to ensure that all content was aligned with the learning objectives and target vocabulary identified through content analysis, the clarity and the accuracy of the materials. The material was exposed to a jury of seven experts specialized in EFL instruction, 5 head teachers and 7 supervisors to check its clarity and validity. The jury appreciated the construction of the material, its variety and clarity.

Beyond content quality, the researcher carried out a technical quality check of all uploaded materials. Audio and video recordings were exposed to specialists in educational technology to confirm clear pronunciation, sound quality, visual clarity, accurate subtitles, and proper synchronization with the audio.

In addition, the first lesson of each unit was taught to a sample of first year secondary school students to ensure clarity of instructions, suitability of the linguistic level of the texts to the participants, and to determine the time limit needed for teaching the each lesson. The results revealed the suitability and easiness of the instruction. 60 minutes was enough time to teach the offline lessons.

3.4. Procedures of the experiment

Pretesting

Instruments of the study were administered prior to the real execution of the instructional material to identify both groups' performance in vocabulary learning and autonomy as well as ensuring homogeneity of both groups. Both instruments were administered on both groups. (60) written copies of the instruments were distributed to the participants. The administration lasted for two periods. Table (3) showed the results of pre testing.

Table (3)

t- test results of vocabulary learning pretest between the experimental group and control group.

Group	No	Mean	STD.	T-value	Sig. Level
Control	60	20.49	2.50	0.94	Not sig
Experimental		21.09	2.21		

Table (3) indicated that there were no statistically significant differences between the means of scores of the experimental and that of the control groups in the "vocabulary learning pre-testing", which means that both groups were equivalent in the vocabulary learning.

A pre-learner's autonomy scale was administered to the study participants for the sake of ensuring that the level of the experimental group and the control group were the same in their autonomy in learning level before the experiment.

Table (4)

"t"-test results of autonomy pretest between the experimental group and control group.

Group	No	Mean	SD.	t-value	Sig.	Sig. Level
Control	60	72.0000	4.06360	1.132	. 68	Not sig
experimental		74.5250	3.08002			

Table 4) indicated that there were no statistically significant differences between the experimental group and the control group in the "pre-testing", which means that the two groups were equivalent in the learning autonomy before the study.

Teaching the experimental group participants,

The adaptive flipped learning model based material was implemented to the experimental group and lasted for (7) weeks with three sessions per week (18 sessions for teaching lessons and a unit evaluation lasted for one period after per unit. The duration of each session was about 60 minutes. The researcher presented the instructional material to a volunteer teacher of the first year, explained the procedures of teaching, and how to manage online activities and group work, and assessment procedures. The researcher attended all sessions and took notes of the students responses.

Teaching the control group

The control group was instructed using the regular procedures as presented in the Ministry Teacher's Guide, New Hello Year 1 term 2.

Post-assessment

The researcher administered the post- tests by the end of the implementation to investigate the effectiveness of using adaptive flipped learning model to develop EFL vocabulary learning and learning autonomy among first year secondary school students. Scores were recorded and analyzed statistically.

The delayed vocabulary testing

In order to assess the effectiveness of the adaptive flipped learning model in developing vocabulary retention, the test was administered to both groups, three weeks after the immediate post-test was given. Scores were recorded and analyzed statistically

4. Results and Discussion

The experimental design of the research depended on comparing the participants' scores on the test before and after being instructed through the adaptive flipped learning model. It also depended on comparing the both groups' scores in the post testing. The researcher analyzed the quantitative data using "t" test formula.

4.1. Testing Hypothesis One

The first hypothesis predicted that there would be a statistically significant difference between the means of scores obtained by the participants of the experimental group and that of the control group on the post test of the vocabulary learning (in favor of the experimental group). To test this hypothesis, the results of the test were recorded and statistically analyzed by

using "t- test of independent sample differences". Table (5) showed the analysis of the results.

Table (5)
t-test results of both groups in the post testing of vocabulary learning.

Variable	Group	Mean	Std.	Df	"t"	Sig.	$^2\eta$
Total	Experimental	46.22	5.28	58	14.07	0.01	0.792
	Control	28.89	3.62				

The previous table presented the results of comparing the experimental and control groups in the vocabulary learning test. Analyzing the results, it could be revealed that the experimental group performed significantly better than the control group in the whole test with a high t-value (14.07) and a large effect size using Eta Squared formula (η^2= 0.792) indicating the effectiveness of the adaptive flipped learning model on the vocabulary learning.

4.2. Testing the Second Hypothesis

The second hypothesis predicted that there would be a statistically significant difference between the means of scores obtained by the participants of the experimental group on the pre and post test of the vocabulary learning (in favor of the posttest). To test this hypothesis, the results of the experimental group in the pre –posttest were collected and analyzed statistically. T-test Paired Samples statistic was used to analyze the data statistically and the effect size of the adaptive flipped learning model was calculated by using (Blake ratio). Table (6) showed these results:

Table (6)
Analysis of the Mean scores of the Experimental Group in the Pre-post Vocabulary Learning Test

Level	Experiment	Mean	STD.	Df	"t"	Sig.	Blake
Total	Post	46.22	5.28	59	26.82	0.01	**1.10**
	Pre	21.09	2.21				

The previous table revealed that the experimental group showed a **statistically significant improvement** in vocabulary learning, as the **mean score increased from (21.09) in the pre-test to (46.22) in the post-test**. The **t-value of (26.82)** indicated that the difference between pre- and post-test scores was **statistically significant at the 0.01 level,** indicating the effectiveness of the adaptive flipped learning model used with the experimental group. The large effect size (using the **Blake's effect size (value= 1.10)** and the increased mean score indicated that the intervention effectively enhanced students' vocabulary learning skills.

4.3. The Third Hypothesis

It predicted that "there would be a statistically significant difference between the mean of scores obtained by the experimental group in the vocabulary learning post and delayed test". To test this hypothesis, the results of the experimental group in the post - delayed test were collected and analyzed statistically. T-test Paired Samples statistics was used to analyze the data statistically and the effect size of the adaptive flipped learning model was calculated by using (Blake ratio). Table (7) showed these results:

Table (7)
Analysis of the Mean Scores of the Experimental Group in the Post- delayed Vocabulary Learning Test

Level	Experiment	Mean	STD.	Df	"t"	Sig.
Total	Post	46.22	5.28	59	1.55	Not
	Delayed	44.12	5.01			

The previous table showed that the experimental group maintained a **high level of vocabulary retention** in the delayed test. While there was a slight drop in the mean score in the delayed test (mean= 44.12) , it was **not statistically significant.** The **t-value of 1.55** did **not reach the statistical significance,** meaning the difference between the post-test and delayed test scores is **not statistically significant**, indicating that the **adaptive flipped learning model effectively supported long-term vocabulary retention.**

4.4. The Fourth Hypothesis

It predicted that There would be a statistically significant difference between the mean of scores of the experimental group and that of the control group in the delayed test of vocabulary learning favoring the experimental group.

To test this hypothesis, the results of the test were recorded and statistically analyzed by using "t- test of independent sample differences". Table (8) showed the analysis of the results.

Table (8)
"t"-test Results of Both Groups in the Delayed Testing of Vocabulary Learning.

Variable	Group	Mean	Std.	Df	"t"	Sig.
Total	Experimental	46.22	5.28	58	23.21	0.01
	Control	20.21	2.92			

The previous table showed that the experimental group (mean= 46.22) significantly outperformed the control group (mean=20.21) in the delayed vocabulary learning test. The **t-value of (23.21)** was **very high**, and the **significance level was (0.01)**, indicating that the difference was **highly**

statistically significant. confirming the **long-term effectiveness** of the **adaptive flipped learning model** in supporting vocabulary retention.

4.5. The Fifth Hypothesis

It predicted that "there would be a statistically significant difference between the means of scores obtained by the participants of the experimental group and that of the control group on the post-scale of EFL learning autonomy (in favor of the experimental group). To test this hypothesis, the mean scores of the experimental group and those of the control group in the post-scale of the EFL learning autonomy scale were collected and analyzed statistically. T-test of independent samples was used to analyze the data statistically and the effect size was calculated using (η^2) Eta square. The results were explained in the following table**:**

Table (9)

Differences between the experimental and control groups in the post-learning autonomy scale

Variable	Group	Mean	Std.	Df	"t".	Sig.	$^2\eta$
Total	Control	78.9250	2.54586	58	69.42	0.01	0.981
	Experimental	138.8750	3.91046				

The table showed the results of comparing the experimental and control groups' mean scores in the learning autonomy scale. The results indicated that the experimental group (Mean = 138.8750) significantly outperformed the control group (Mean = 78.9250) indicating a high statistical significance. The experimental group showed significantly higher autonomy level which was due to the use of adaptive flipped learning. Based on the values of (η^2= 0.981), it was clear that the instructional model was highly effective in developing the autonomy of first year secondary school students..

4.6. Testing the sixth Hypothesis

The sixth hypothesis predicted that "there would be a statistically significant difference between the means of scores obtained by the participants of the experimental group on the pre and post-scale of the EFL learning autonomy (in favor of the post-scale administration). To test this hypothesis, scores of the experimental group in the pre-post scale were collected and analyzed statistically. t-test of Paired Samples was used to analyze the data statistically and the effect size was calculated by using Blake ratio. The results were presented in table (10):

Table (10)

Analysis of the experimental group mean scores in the pre-post EFL learning autonomy scale

Variable	Group	Mean	Std.	DF	T	Sig.	Blake
Total	Pre	74.5250	3.08002	58	64.21	0.01	١،38
	Post	138.8750	3.91046				

The previous table showed the pre- and post learning engagement scale results, comparing the experimental group participants' autonomy level before and after being instructed with the adaptive flipped learning model. The data showed a significant increase in the learners' autonomy after the intervention, as the participants' mean score in the learning autonomy scale in the post testing was (138.8750), indicating an observed effectiveness size of the adaptive flipped learning model (Blake value= 1.38).

4.7. Discussion

The present study aimed at investigating the effectiveness of using an adaptive flipped learning model to develop first year secondary stage students' vocabulary learning and autonomy. The study compared the performance of the experimental group in the pre and post testing of both vocabulary learning and autonomy. The results revealed a significant improvement in vocabulary learning and autonomy of the experimental group. The results, additionally, revealed the outperformance of the experimental group than the control group in both the vocabulary learning and autonomy.

The analysis of the study group performance in the pre-test of vocabulary learning and autonomy revealed notably low performance levels. Prior to the implementation of the adaptive flipped learning model, several persistent challenges in ~~the~~ vocabulary learning and autonomy were evident among the participants. A majority of them struggled with employing synonyms and antonyms contextually and identifying word roots, relying instead on rote memorization devoid of meaningful application. Furthermore, they exhibited difficulty in recognizing or appropriately using prefixes and suffixes, alongside confusion in distinguishing homophones and homographs. Additionally, learners demonstrated reluctance toward independent vocabulary exploration, displaying minimal motivation to revise or expand their lexical knowledge beyond classroom instruction.

After being instructed through the adaptive flipped learning model, substantial improvements were observed in the post-tests. The Participants of the experimental group exhibited enhanced proficiency in applying a range of word-learning skills, including contextual utilization of synonyms and antonyms, accurate formulation of word definitions, proper identification and application of prefixes and suffixes, confident differentiation between homophones and homographs, and solving analogies by recognizing word roots to infer meanings of unfamiliar words. Moreover, learners demonstrated positive engagement in managing their vocabulary learning process, particularly in reviewing lexical items at home through flipped materials. They effectively utilized self-assessment tools, took responsibility for tracking their progress, and employed metacognitive strategies such as goal-setting and comprehension monitoring.

These advancements in vocabulary learning and autonomy can be attributed to several integral components of the instructional material designed within the adaptive flipped learning model. One key element was the implementation of personalized learning paths. The adaptive flipped model facilitated individualized learning preferences, allowing students to engage with materials that corresponded to their learning style, whether visual or verbal. Visual learners benefited from content such as infographics, diagrams, and animated videos that illustrated vocabulary in context, while verbal learners engaged with podcasts, audio recordings, and dictation exercises that supported word recognition, pronunciation, and contextual use.

Furthermore, the adaptive component of the model ensured that each learner progressed at a pace appropriate to their proficiency and processing speed. Students were not bound by a fixed instructional system; instead, they had the autonomy to revisit content, pause, or accelerate their learning based on their comfort and comprehension level out of the class time. This flexibility minimized cognitive overload and allowed for deeper cognitive engagement with vocabulary items. As a result, learners experienced greater clarity, improved retention, and more meaningful application of vocabulary in communication tasks.

The integration of technology into the adaptive flipped learning model offers a range of pedagogical benefits that significantly enhance vocabulary learning in EFL contexts. Technology serves as both a delivery medium and an instructional support system, enabling personalized learning experiences that extend beyond the limitations of traditional classrooms. Through digital platforms like Google Classroom, the participants were able to access a rich repository of vocabulary resources, such as animated videos, interactive flashcards, visuals, podcasts, and self-paced quizzes, tailored to their preferred learning styles and pace. These varied formats not only support better engagement but also accommodate students' individual cognitive preferences, thereby fostering deeper processing and retention of vocabulary.

Explicit training on vocabulary learning strategies, including affixation, root identification, analogy formation, and semantic differentiation, was systematically integrated into instruction. These skills were reinforced through classroom activities involving guided questioning and targeted practice. Departing from conventional rote memorization, the scaffolding-based instructional approach empowered students to become strategic and intentional learners, capable of guessing word meanings and drawing connections across diverse linguistic contexts. The implementation of cognitive strategies fostered long-term retention and supported transferable competencies applicable to reading comprehension, writing, and listening.

Moreover, following flipped learning stages significantly enhances the effectiveness of the adaptive learning model by transforming the traditional classroom into a dynamic, student-centered environment where instruction is both personalized and active. In the flipped model, core instructional content is delivered outside of class, typically through online resources allowing students to engage with the new material at their own pace. Once in the classroom, time is devoted to deep practice and application, where the teacher acts as a facilitator. This shift enables immediate feedback, peer collaboration, and targeted support. Moreover, it allows more time for differentiated instruction, giving struggling learners more attention while enabling advanced learners to explore content in greater depth. Thus, flipped learning therefore complements adaptive learning by maximizing classroom time for meaningful, individualized interaction and minimizing passive content delivery. It leads to increased engagement, deeper understanding, better retention, and improved vocabulary performance, particularly in EFL contexts where exposure and practice are critical.

The results of the study aligned with the principles of the constructivism which emphasizes active, learner-centered engagement where knowledge is constructed through meaningful experiences. The flipped model provides learners with opportunities to interact with content in authentic, contextualized scenarios, especially during in-class applications such as collaborative tasks and communicative activities. By building on prior knowledge and engaging in self-directed learning, students internalize vocabulary through construction rather than passive reception.

In accordance with Sweller's cognitive load theory, which ensures that learning is optimized when instructional materials are designed to manage intrinsic and extraneous cognitive load, the adaptive flipped model helped minimize cognitive overload by spacing instruction across pre-class and in-class phases. Online resources allow learners to engage with manageable chunks of information, revisit complex vocabulary, and reduce the pressure of real-time comprehension, thereby enhancing processing efficiency and long-term retention.

In agree with the theory of individual differences which acknowledges that learners vary in their cognitive styles, motivation, background knowledge, and pace of learning. Adaptive flipped learning directly addresses this diversity by offering flexible access to differentiated materials. Students can choose resources that align with their strengths such as visual videos for image-oriented learners or audio clips for auditory learners, and progress at a pace that suits their learning capacity. This personalized learning environment promotes equity and maximizes individual achievement.

The results of the current study are strongly aligned with and reinforced by a broad base of previous research, such as Santanasamy and Yunus (2022) which emphasize how flipped learning enhances communication skills through practice and promotes accessibility and active engagement with content, all of which contribute to vocabulary development. In parallel, the current results added to the studies of Davari and Mall-Amiri (2022), Luan et al. (2023), and Sheerah and Yadav (2022) which found that flipped classrooms improve language acquisition by promoting peer interaction and collaborative learning, key factors that also foster autonomy and deeper vocabulary use.

Furthermore, this study results resonated with Putro et al. (2023), Suyantiningsih et al. (2021), and Eryilmaz and Ahmed (2017) who asserted that adaptive flipped models personalize learning and foster critical thinking. These findings underscore the observed improvement in retention and engagement in the current study, especially as students were able to repeatedly engage with content and receive differentiated support based on their progress.

The study results regarding enhanced autonomy aligned with the studies of Chen and Hsu (2022), AlQahtani and Al-Otaibi's (2020) and Reinders and White (2016), who emphasize that flipped learning structures cultivate self-directed learning habits and metacognitive awareness. This is crucial in EFL contexts, where students must often take initiative in expanding their vocabulary beyond the classroom. Similarly, the observed retention improvement mirrors findings that visual-verbal instruction strategies significantly aid vocabulary learning.

4.8. Conclusion

In conclusion, the results of the current study provided clear evidence that the adaptive flipped learning model was an effective pedagogical approach for developing vocabulary learning, retention, and learner autonomy among secondary school students. Through structured pre-learning exposure, differentiated in-class engagement, and reflective post-learning activities, students developed a deeper understanding of vocabulary concepts such as synonyms, antonyms, affixes, homophones, analogies, and word roots. Furthermore, this research underscored the value of integrating technology-enhanced instructional design with adaptive, student-driven methodologies in language education. It highlights that when instruction is personalized, reflective, and contextually meaningful, vocabulary learning becomes more empowering for learners.

4.9. Recommendations and Pedagogical Implications

Based on the results of the study on using an adaptive flipped learning model to develop vocabulary learning, retention, and autonomy among secondary school students, the following recommendations and pedagogical implications could be proposed:

EFL Teachers are encouraged to enhance vocabulary learning and learner autonomy by implementing a structured flipped learning approach that actively engages students at each stage of instruction. They should assign pre-class vocabulary tasks using multimedia resources, such as interactive flashcards, instructional videos, and digital exercises, allowing students to explore and familiarize themselves with new lexical items at their own pace. In the classroom, instruction should be differentiated based on students' pre-class performance, ensuring that struggling learners receive targeted support while advanced students engage in extended practice. Teachers should create immersive learning experiences by incorporating context-based activities, such as role-playing, storytelling, and analogy formation, which reinforce vocabulary retention through meaningful use. Additionally, fostering reflection and autonomy requires guiding students in setting personal learning goals, monitoring their progress, and utilizing self-assessment tools. By embedding these principles into daily instruction, educators can create a dynamic and learner-centered environment that supports vocabulary acquisition and long-term skill development.

EFL Students are advised to actively take responsibility for their pre-class learning by thoroughly engaging with vocabulary materials, identifying unclear areas, and preparing themselves for effective participation in classroom activities. During in-class sessions, they should contribute meaningfully to discussions and collaborative tasks, integrating new vocabulary into diverse contexts to reinforce memory and deepen comprehension. To sustain retention and independence, they can develop self-monitoring strategies such as maintaining vocabulary journals, regularly reviewing flashcards, and engaging in self-quizzing exercises. Seeking and utilizing feedback from peers and teachers constructively will further refine their understanding and improve vocabulary usage.

Curriculum designers should embed vocabulary learning objectives that align with flipped learning principles while ensuring content adaptability for various student proficiency levels. Scaffolding tools, including concept maps, vocabulary organizers, and practice quizzes, should be incorporated into textbooks and digital supplements to support independent learning. A diversified instructional approach is essential, incorporating multiple vocabulary acquisition strategies such as morphological analysis, contextual guessing, and semantic mapping. Additionally, autonomy-building components, such as learner portfolios and reflective prompts, should be integrated into curriculum guidelines to foster self-directed learning and long-term vocabulary mastery.

EFL supervisors should enhance vocabulary instruction by facilitating professional development workshops focused on flipped learning and adaptive teaching methodologies. They should actively monitor classroom

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implementation of these approaches, providing enough training to ensure instruction remains learner-centered and responsive to individual needs. The use of formative assessment tools should be encouraged to track students' vocabulary development, enabling teachers to make informed instructional adjustments. Furthermore, promoting collaborative engagement among educators, through sharing best practices, digital resources, and success stories will contribute to a more effective and dynamic vocabulary learning environment, fostering autonomy and communicative competence among learners.

References

Abad, E., & Baradaran, A. (2013). The relationship between learner autonomy and vocabulary learning strategies in Iranian EFL learners with different language proficiency level. *International Journal of Applied Linguistics & English Literature, 2*(3), 176–185.

Afzal, N. (2019). A study on vocabulary-learning problems encountered by BA English majors at the university level of education. *Arab World English Journal, 10*(3), 81–98.

Al-Lahham, I. (2016). *The effectiveness of using keyword-based instruction on developing eighth graders' English vocabulary and its retention in Gaza* (Unpublished master's thesis). College of Education, Islamic University.

Alonazi, S. M. (2017). The role of teachers in promoting learner autonomy in secondary schools in Saudi Arabia. *English Language Teaching, 10*(7), 183–190.

Alrashidi, O. (2022). Exploring learner autonomy: Secondary school EFL teachers' beliefs and practices in the Saudi context. *World Journal of English Language, 12*(8), 97- 123

Amiryousefi, M. (2019). The incorporation of flipped learning into conventional classes to enhance EFL learners' L2 speaking, L2 listening, and engagement. *Innovation in Language Learning and Teaching, 13*(2), 147–161.

Bajramia, L. (2015). Teacher's new role in language learning and in promoting learner autonomy. *Procedia - Social and Behavioral Sciences, 199*, 423-427

Benson, P. (2011). *Teaching and researching autonomy* (2nd ed.). London: Routledge

Berger, A., Heaney, H., Resnik, P., Rieder-Bünemann, A., & Savukova, G. (2022). *Developing advanced English language competence: A research-informed approach at tertiary level*. Springer Nature.

Challob, A. I. (2021). The effect of flipped learning on EFL students' writing performance, autonomy, and motivation. *Education and Information Technologies*, 26, 7795–7821.

Chen, H.-R., & Hsu, W.-C. (2022). Do flipped learning and adaptive instruction improve student learning outcome? A case study of a computer programming course in Taiwan. *Frontiers in Psychology, 12*, 812424.

Cheng, L., Ritzhaupt, A. D., & Antonenko, P. (2019). Effects of the flipped classroom instructional strategy on students' learning outcomes: A meta-analysis. *Educational Technology Research and Development, 67*, 793–824.

Chicho, K. Z. H., & Zrary, M. O. H. (2022). Using visual media for improving writing skills. *Canadian Journal of Language and Literature Studies, 2*(4), 23–31.

Daly, N. P. (2022). Investigating learner autonomy and vocabulary learning efficiency with MALL. *Language Learning & Technology, 26*(1),1-16

Dam, L & Legenhausen, L. (2017). **Language learner autonomy: Theory, practice and research. Multilingual Matters**

Davari, M., & Mall-Amiri, B. (2022). The effect of flipped classroom on EFL learners' speaking complexity, accuracy, and fluency: A mixed-methods study. *Research in English Language Pedagogy, 10*(4), 685–707.

El-Maleh, A. A. A. I., & Ramadan, E. S. M. (2020). Using E-task-based learning for developing secondary school students' EFL vocabulary skills. *Benha University Faculty of Education Journal, 31*(123, Part 1), 55–70.

Emam, S. M. (2020). Effect of interaction between a flipped adaptive learning environment and learning types (analytic–comprehensive) to develop skills of using Web 2.0 applications and motivation for teachers pre–service. *International Journal of Instructional Technology and Educational Studies, 1*(2), 7–9.

Erbil, D. G. (2020). A review of flipped classroom and cooperative learning method within the context of Vygotsky theory. *Frontiers in Psychology, 11*, 1157.

Eryılmaz, M., & Ahmed, A. (2016, October 24–26). *Adaptive technologies for flipped learning* [Conference presentation]. 6th International

Conference on "Innovations in Learning for the Future" 2016: Next Generation, İstanbul, Turkey.

Eryılmaz, M., & Ahmed, A. (2017). An adaptive teaching model for flipped classroom. *International Journal on Recent and Innovation Trends in Computing and Communication, 5*(7), 35–39.

Fakhry, F., F.(2024). Using the REACT strategy in enhancing English language vocabulary acquisition and academic engagement among secondary school students. *Benha University Faculty of Education Journal, 35*(137.2),137-195.

Fazey, D. M. A., & Fazey, J. A. (2020). The potential for autonomy in learning: Perceptions of competence, motivation and locus of control in first-year undergraduate students. Studies in Higher Education, 26, 345-361. doi:10.1080/03075070120076309

Fosnot, C. T. (Ed.). (2013). *Constructivism: Theory, perspectives, and practice* (2nd ed.). Teachers College Press.

Gamble, C., Aliponga, J., Wilkins, M., Koshiyama, Y., Yoshida, K., & Ando, S. (2012). Examining learner autonomy dimensions: Students' perceptions of their responsibility and ability. In A. Stewart & N. Sonda (Eds.), *JALT2011 Conference Proceedings* (pp. 263–272). The Japan Association for Language Teaching.

Gao, X., & Hew, K. F. (2023). A flipped systematic debugging approach to enhance elementary students' program debugging performance and optimize cognitive load. *Journal of Educational Computing Research*.

Guo, F., Zhang, Y., & Wu, Z. (2022). Mobile-assisted vocabulary learning through the Shanbay App outside the classroom: Effects of self-regulation and peer scaffolding. *Frontiers in Psychology, 13*, 993224

Guralnick, D., Auer, M. E., & Poce, A. (Eds.). (2024). *Creative approaches to technology-enhanced learning for the workplace and higher education: Proceedings of 'The Learning Ideas Conference' 2024* (Vol. 2). Springer Nature.

Haddada, R. H. (2016, April 14–17). *Developing learner autonomy in vocabulary learning in classroom: How and why can it be fostered?* [Conference presentation]. International Conference on Teaching

and Learning English as an Additional Language (GlobELT 2016), Antalya, Turkey.

Harasim, L. (2017). *Learning theory and online technologies* (2nd ed.). Taylor & Francis.

Heng, K. (2011). *Effective vocabulary learning strategies: Perspectives from Cambodian students and teachers* (Master's dissertation, Loyal University of Phnom Penh, Institute of Foreign Language, Department of English).

Herusatoto, H. (2019). Longer EFL vocabulary retention: Learning in context or in isolation. *Lingua: Jurnal Ilmu Bahasa dan Sastra, 6*(2), 171–183.

Holec, H. (1981). *Autonomy and foreign language learning*. Pergamon Press. (Original work published 1979)

Hornby, A. S. (2007). *Oxford advanced learner's dictionary* (7th ed.). Oxford University Press.

Ibrahim, N. W., & Alhodairy, Y. H. (2023). Enhancing learners' autonomy in vocabulary learning in EFL Libyan classroom. *East Asian Journal of Multidisciplinary Research, 2*(11), 4615–4626.

Kakosimos, K. E. (2015). Example of a micro-adaptive instruction methodology for the improvement of flipped-classrooms and adaptive-learning based on advanced blended-learning tools. *Education for Chemical Engineers, 12*, 1–11.

Karimi, M., & Hamzavi, R. (2017). The effect of flipped model of instruction on EFL learners' reading comprehension: Learners' attitudes in focus. *Advances in Language and Literary Studies, 8*(1), 95–103. https://doi.org/10.7575/aiac.alls.v.8n.1p.95

Khan, M. R., & Zulfiquar, F. (2022). Effect of flipped learning method on the writing skill of EFL Saudi students during the COVID-19. *International Journal of English Language Teaching, 10*(2), 1–11. https://doi.org/10.5430/ijelt.v10n2p1

Kharaghani, N. & Ghonsooly, B. (2015). The impact of vocabulary knowledge on reading comprehension ability of Iranian English learners receiving reciprocal teaching and cooperative grouping intervention program. International Journal of Research Studies in Education. 4(3).

Khotimah, K., Widiati, U., Mustofa, M., & Ubaidillah, M. F. (2019). Autonomous English learning: Teachers' and students' perceptions. *Indonesian Journal of Applied Linguistics, 9*(2), 371-381.

Kilic, M. (2019). Vocabulary Knowledge as a Predictor of Performance in Writing and Speaking: A Case of Turkish EFL Learners. PASAA. 57(1), 1-6.

Kiraly, D. (2014). *A social constructivist approach to translator education: Empowerment from theory to practice*. Routledge.

Köroğlu, Z. Ç., & Çakir, A. (2017). Implementation of flipped instruction in language classrooms: An alternative way to develop speaking skills of pre-service English language teachers. *International Journal of Education and Development Using Information and Communication Technology, 13*(2), 42–55.

Kamińska, P. M. (2014). *Learning styles and second language education*. Cambridge Scholars Publishing.

Kuo, Y.-C., & Chang, Y.-C. (2023). Adaptive teaching of flipped classroom combined with concept map learning diagnosis—An example of programming design course. *Education and Information Technologies, 28*(7), 8665–8689.

Lawter, L., & Garnjost, P. (2023). Effectiveness of flipped classroom format in quantitative and non-quantitative business courses–A meta-analysis. *The International Journal of Management Education, 21*(3), 100849.

Lessard-Clouston, M. (2013). *Teaching vocabulary*. TESOL International Association.

Little, D. (2009). Language learner autonomy and the European Language Portfolio: Two L2 English examples. *Language Teaching, 42*(2), 222–233.

Luan, L., Yi, Y., Hwang, G.-J., Dong, Y., Jing, B., & Liu, J. (2023). Facilitating EFL learners' willingness to communicate amidst the pandemic: A digital storytelling-based online flipped learning approach. *Innovation in Language Learning and Teaching*, 1–16.

MacArthur, C. A., Metsala, J. L., & Shankweiler, D. (2016). *Learning practices*. Guilford Press.

Manzanera, A. (2023). Incidental vocabulary learning and retention in education-oriented communicative tasks: The effect of testing condition. *Miscellanea: Journal of English and American Studies, 67*, 15–40.

Masoudi, G. (2017). The effect of vocabulary self-selection strategy and input enhancement strategy on the vocabulary knowledge of Iranian EFL learners. *English Language Teaching*, *10*(8), 32–43.

Milton, J., & Hopwood, O. (2022). *Vocabulary in the foreign language curriculum: Principles for effective instruction*. Taylor & Francis.

Mohammed, A. M. H., & Olwi, A. M. A. (2024). The acquisition of vocabulary by beginner English language learners in Saudi Arabia: The role of learner autonomy. *Educational Sciences Journal*, (4, Part 2) 1-42.

Nation, I. S. P. (2022). Vocabulary-learning strategies and autonomy. In *Learning vocabulary in another language* (pp. 316–335). Cambridge University Press.

Nemati, A. (2013). Vocabulary learning strategies: A short way to long term retention. *Linguistics and Literature Studies, 1*(1), 8–14.

Neuman, S., & Dwyer, J. (2009). Missing in action: Vocabulary instruction in pre-K. *The Reading Teacher, 62*(5), 384–392.

Nguyen, Son & Habók, Anita. (2020). Non-English-Major Students' Perceptions of Learner Autonomy and Factors Influencing Learner Autonomy in Vietnam. Relay Journal, , 3(1)122-139.

Ocampo, E. N., Siahaan, K. W. A., Sinaga, S. J., & Cutillas, A. L. (2023). Pedagogical exemplars for mathematics across learning styles. *Edunesia: Jurnal Ilmiah Pendidikan, 4*(2), 644–658

Palfreyman, D. (2003). The representation of learner autonomy and learner independence in organizational culture. In D. Palfreyman & R. C. Smith (Eds.), *Learner autonomy across cultures: Language education perspectives* (pp. 183–200). Palgrave Macmillan.

Pawlak, M. (2021). Investigating language learning strategies: Prospects, pitfalls and challenges. *Language Teaching Research, 25*(5), 817–835.

Phoeun, M., & Sengsri, S. (2021). The effect of a flipped classroom with communicative language teaching approach on undergraduate students' English speaking ability. *International Journal of Instruction, 14*(3), 1025–1042.

Prior, A., Goldina, A., Shany, M., Geva, E. & Katzir, T. (2014). Lexical inference in L2: Predictive roles of vocabulary knowledge and reading skill beyond reading comprehension. Reading and Writing. 27(8), 1-9.

Putri, E. (2022). An impact of the use Instagram application towards students' vocabulary. *Pustakailmu.id, 2*(2), 1–10.

Reinders, H., & White, C. (2016). 20 years of autonomy and technology: How far have we come and where to next? *Language Learning & Technology*, 20(2), 143–154.

Robinson, D. H., Yan, V. X., & Kim, J. A. (2022). *Learning styles, classroom instruction, and student achievement*. Springer Nature.

Ruiz, R. G. (2025). *New technological applications in the flipped learning model*. IGI Global.

Santhanasamy, C., & Yunus, M. M. (2022). A systematic review of flipped learning approach in improving speaking skills. *European Journal of Educational Research, 11*(1), 127–139.

Sayed, W. S., Noeman, A. M., Abdellatif, A., Abdelrazek, M., Badawy, M. G., Hamed, A., & El Tantawy, S. (2023). AI-based adaptive personalized content presentation and exercises navigation for an effective and engaging e-learning platform. *Multimedia Tools and Applications, 82*(3), 3303–3333. https://doi.org/10.1007/s11042-022-12497-2

Schmitt, N. (2019). Understanding vocabulary acquisition, instruction, and assessment: A research agenda. *Language Teaching, 52*(3), 261–274.

Sein-Echaluce, M. L., Fidalgo-Blanco, Á., & García-Peñalvo, F. J. (2019). *Innovative trends in flipped teaching and adaptive learning*. IGI Global.

Shah, S., & Arinze, B. (2023). Comparing student learning in face-to-face versus online sections of an information technology course. *IEEE Transactions on Professional Communication, PP*(99), 1–11.

Sheerah, H. A. H., & Yadav, M. S. (2022). An analytical investigation of flipped classroom to improve Saudi EFL learners' speaking skills: A case study at Applied College. *Arab World English Journal*, (8),274-298

Tehseen, S., & Hadi, N. U. (2015). Factors influencing teachers' performance and retention. *Mediterranean Journal of Social Sciences, 6*(1), 233–244.

Teng, F. (2019). Autonomy, agency, and identity in teaching and learning English as a foreign language. *Springer Nature Link*

Troussas, C., Giannakas, F., Sgouropoulou, C., & Voyiatzis, I. (2023). Collaborative activities recommendation based on students' collaborative learning styles using ANN and WSM. *Interactive Learning Environments, 31*(1), 54–67.

Tunggyshbay, M., Balta, N., & Admiraal, W. (2023). Flipped classroom strategies and innovative teaching approaches in physics education: A systematic review. *EURASIA Journal of Mathematics, Science and Technology Education*, *19*(6), em2283.

Ushioda, E. (2011). Language learning motivation, self and identity: Current theoretical perspectives. *Computer Assisted Language Learning*, *24*(3), 199–210.

Vieira, F. (2020). Pedagogy for autonomy in Language teacher education. Routledge.

Xiao, N., Thor, D., & Zheng, M. (2021). Student preferences impact outcome of flipped classroom in dental education: Students favoring flipped classroom benefited more. *Education Sciences, 11*(4), 150.

Xodabande, I., & Atai, M. (2020). Using mobile applications for self-directed learning of academic vocabulary among university students. *Open Learning*, *37*(6).

Yao, F. (2021). A Study on the Effects of Chinese EFL Learners' English Proficiency and Involvement Load on Incidental Vocabulary

Acquisition. International Journal of English Linguistics. 11(4). 76-76.

Yılmaz, F. G. K., & Yılmaz, R. (2023). Exploring the role of sociability, sense of community and course satisfaction on students' engagement in flipped classroom supported by Facebook groups. *Journal of Computers in Education, 10*(1), 135–162.

Zeybek, G., & Şentürk, C. (2020). Analysis of pre-service teachers' learning styles according to Vermunt learning style model. *International Journal of Educational Methodology, 6*(1), 145–160.

Zhou, X. (2023). A conceptual review of the effectiveness of flipped learning in vocational learners' cognitive skills and emotional states. *Frontiers in Psychology, 13*, 1039025. https://doi.org/10.3389/fpsyg.2022.1039025