



LANGUAGE LEARNING STRATEGIES OF ESP LEARNERS: A COMPARISON BETWEEN DURING AND POST-PANDEMIC SITUATION

by

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Abstract:

Several studies have highlighted the importance of language learning strategies (LLS) for second and foreign-language learners. These strategies have played a significant role in distinguishing between more successful and less successful language learners. However, the outbreak of the COVID-19 pandemic in 2020 brought about unprecedented changes in the teaching-learning process, with a shift towards online platforms. This study aimed to determine what language learning strategies were applied by the 85 learners of the Mathematics and Biology Departments, ESP (English for Specific Purposes) learners taking English courses during and after the pandemic. In addition, this study also investigated whether there are any similarities or differences in the language learning strategies employed by using comparative design. To collect data, the researcher utilized the Strategy Inventory of Language Learning from Oxford (1990), translated into Indonesian, to ensure clear comprehension among the learners. Descriptive statistics for means and standard deviations were then used to analyze the data. The analysis revealed that, regardless of the circumstances, the students applied all strategies in their learning. Then, they consistently applied the metacognitive and memory strategies more frequently than others. Additionally, the findings indicated that the students utilized the social strategy during the COVID-19 pandemic, while the affective strategy was employed somewhat in the post-pandemic period. The outcomes of this study have significant implications as they raise awareness among learners and ESP instructors about the benefits of employing language learning strategies. Recognizing and utilizing these strategies can significantly enhance language learning outcomes. By understanding the preferred strategies employed by students during different periods, instructors can tailor their teaching approaches accordingly to maximize the effectiveness of language instruction.

Keywords: Covid-19 pandemic; language learning ;ESP learners; online learning; offline learning, strategies

Abstrak:

Beberapa penelitian telah menyoroti pentingnya strategi pembelajaran bahasa (LLS) untuk pelajar bahasa kedua dan asing. Strategi-strategi ini telah memainkan peran penting dalam membedakan antara pelajar bahasa yang lebih sukses dan kurang berhasil. Namun, merebaknya pandemi Covid-19 pada tahun 2020 membawa perubahan yang belum pernah terjadi sebelumnya dalam proses belajar-mengajar, dengan pergeseran ke platform daring. Penelitian ini bertujuan untuk mengetahui strategi pembelajaran bahasa apa saja yang diterapkan oleh 85 peserta didik Departemen Matematika dan Biologi, yang merupakan peserta didik ESP (English for Specific Purposes) yang mengambil mata

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kuliah bahasa Inggris, selama dan setelah pandemi. Selain itu, penelitian ini juga menyelidiki apakah ada persamaan atau perbedaan dalam strategi pembelajaran bahasa yang digunakan dengan menggunakan desain komparatif. Untuk mengumpulkan data, peneliti menggunakan Strategy Inventory of Language Learning dari Oxford (1990), yang diterjemahkan ke dalam bahasa Indonesia untuk memastikan pemahaman yang jelas di antara peserta didik. Statistik deskriptif untuk sarana dan standar deviasi kemudian digunakan untuk menganalisis data yang dikumpulkan. Hasil analisis mengungkapkan bahwa, terlepas dari keadaan, siswa menerapkan semua strategi dalam pembelajaran mereka. Kemudian, mereka secara konsisten menerapkan strategi metakognitif dan memori lebih sering daripada strategi lainnya. Selain itu, temuan menunjukkan bahwa siswa menggunakan strategi sosial selama pandemi Covid-19, sedangkan strategi afektif digunakan pada tingkat yang lebih rendah pada periode pascapandemi. Hasil penelitian ini memiliki implikasi yang signifikan karena mereka meningkatkan kesadaran di kalangan peserta didik dan instruktur ESP tentang manfaat menggunakan strategi pembelajaran bahasa. Mengenali dan memanfaatkan strategi ini dapat sangat meningkatkan hasil pembelajaran bahasa. Dengan memahami strategi yang disukai yang digunakan oleh siswa selama periode yang berbeda, instruktur dapat menyesuaikan pendekatan pengajaran mereka sesuai untuk memaksimalkan efektivitas pengajaran bahasa.

Kata kunci: *ESP pelajar, pembelajaran daring, pembelajaran luring, pandemi Covid-19, strategi pembelajaran bahasa*

INTRODUCTION

English is widely known and mastered by everyone worldwide, including Indonesians. This language is used in numerous fields such as education, social, business, and trade, as well as to understand technology and so on. Therefore, in Indonesia, English is learned at every level of education, starting from kindergarten and/or elementary school. At the tertiary level, English is a compulsory general introductory course (Mata et al./MKDU) that must be programmed for those who are in the first year of their education, including students at FKIP Lambung Mangkurat University (ULM) Banjarmasin.

At Lambung Mangkurat University (ULM), the English course is intended for all existing majors or study programs and even for English Language Education Study Program students. The purpose of this course is for all students to know, comprehend, and be able to use English in their field of knowledge accordingly. English courses deliberately studied by students with specific goals can also be called English for Specific Purposes (ESP). Hutchinson and Waters (1987) define English for Specific Purposes (ESP) as an approach to English learning that tailors the learning topics and methods based on the specific needs and purposes of the learners. This approach distinguishes ESP from general English learning, focusing on addressing the learners' specific language needs and goals. In higher education, students may perceive the English course as compulsory rather than a choice driven by personal motivation (Febriyanti, 2018). This challenges English teachers to create an engaging and purposeful learning experience for these students. The objective is to ensure the English course is academically rigorous, applicable, and beneficial to the student's future

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careers or academic pursuits. Therefore, to achieve this, English teachers and stakeholders must design and implement learning materials, tasks, and activities that align with the specific needs and interests of the students.

However, many students, especially in ULM, encounter difficulties and problems in learning English, which leads them to become unsuccessful language learners. Concerning that, research conducted by Rubin (1975), O'Malley & Chamot (1990), Oxford (1990), Lawson & Hogben (1996), Pintrich (2000), De Bot et al. (2007), and Griffiths (2010), have consistently shown that language learners who employ specific language learning strategies tend to achieve tremendous success in language learning, regardless of their first language background. Other recent findings also mention the same thing as the studies from Bessai (2018), Feng et al. (2020), and Marlin et al. (2021). Specifically, Lawson and Hogben (1996) mention that learners who utilize a wide range of learning strategies demonstrate higher proficiency levels and take greater responsibility for their learning, resulting in improved performance. Additionally, Pintrich (2000) emphasizes that motivated students actively engage in their learning by employing various strategies. Successful learners understand effective learning strategies deeply and can select and utilize the most appropriate ones for their specific learning needs (Wirawati et al., 2022). In general, the relationship between language learning strategies and language proficiency is generally positive, indicating that learning strategies play a critical and significant role in enhancing the outcomes of language learning for learners. Therefore, it is essential for students, particularly those facing difficulties in learning English, to develop and apply effective language learning strategies to support their language proficiency and overall learning success. By becoming more aware of different strategies and how to apply them appropriately, students can take greater control of their learning process and enhance their language skills.

Language learning strategies are the actions and behaviors students actively employ to control and manage their learning process (Oxford, 1990). It encompasses the various ways in which students regulate their learning experiences. When learners participate in the learning process, there is a connection between cognition and action based on a view of learners as responsible agents who are aware of their wants and goals. They are expected to elaborate a broad range of language learning strategies that will assist them in becoming more independent and autonomous learners. Moreover, they should know how to process the information received and what learning strategies they should utilize to acknowledge, work

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on, manipulate, learn, or remember. However, learners need to know that they employ strategies in their studies. As a result, it is unavoidable that learners should receive suitable strategy instruction and training to raise awareness of their strategies and train them in the implementation. By being informed of which strategies the learners use, the teachers can decide what methods or strategies to apply in the teaching-learning process. Afterward, teachers must continue to evaluate learners' strategy use and provide additional support even after becoming autonomous and independent strategy users.

Considerable research has been conducted to categorize various learning strategies in second language (L2) acquisition. O'Malley and Chamot (1990) proposed a classification based on cognitive theory, which identified three distinct groups of language learning strategies: cognitive, metacognitive, and social-affective strategies. Cognitive strategies refer to learners' methods and approaches to obtain, process, understand, store, recall, and apply language information. Metacognitive strategies involve the actions learners take to plan, organize, and monitor their learning process. Socio-affective strategies, conversely, center around social interactions and the utilization of interpersonal activities to enhance language learning.

In contrast to O'Malley and Chamot's classification, Oxford (1990) proposed a different classification of Language Learning Strategies (LLS), which consists of two main categories: direct and indirect. Direct strategies directly influence the learning process by assisting learners in bridging knowledge gaps and gaining a deeper understanding of the target language. These strategies encompass memory strategies, cognitive strategies, and compensation strategies. Memory strategies involve techniques learners use to improve their ability to remember and retain new information. These strategies include creating mental associations or images to aid in storing and retrieving learned material. Examples of memory strategies include placing new words in meaningful contexts, using keywords, and mentally representing sounds.

On the other hand, cognitive strategies focus on the processing and organization of information to enhance comprehension and language production. These strategies involve note-taking, summarizing, reasoning, and creating organizational structures to enhance understanding and retention of linguistic content. Then, compensation strategies aim to bridge the language gap between a learner's first language (L1) and the second language (L2). These strategies come into play when learners encounter difficulties in communication due to

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language differences. Examples of compensation strategies include inferring the meaning of unknown words, using gestures while reading or speaking, actively listening for or employing synonyms, and paraphrasing to overcome comprehension challenges.

Meanwhile, as proposed by Oxford (1990), indirect strategies play a supportive part in language learning by facilitating and managing the learning process without directly relating to the target language. This category encompasses metacognitive, affective, and social strategies. First, metacognitive strategies deliberately manipulate language knowledge and cognitive functions to improve language learning and usage. These strategies center around organizing, planning, and evaluating one's learning process. By actively monitoring their learning, learners can identify areas of improvement, set goals, and make adjustments to optimize their language acquisition.

In contrast, affective strategies relate to learners' emotions, feelings, motivation, anxiety, and self-efficacy in the context of language learning. These strategies are aimed at enabling learners to regulate their emotional behaviors, attitudes, and motivation, thereby creating a positive learning environment. Examples of effective strategies include employing relaxation techniques or engaging in activities in the target language to reduce anxiety and promote a positive emotional state. The last social strategies focus on interactions with others, seeking help or input, receiving feedback, and engaging with the culture associated with the second language. These strategies involve asking questions, collaborating with peers, and raising empathy for individuals who speak the target language. By engaging in social interactions, learners can practice their language skills, gain insights into cultural nuances, and receive valuable feedback to enhance their language proficiency.

Due to the COVID-19 pandemic since the beginning of 2020, which spread globally, there are changes in the teaching-learning process. All teachers and learners cannot sit in at schools and are forced to stay inside their homes. This situation made both parties adopt a new design of the teaching-learning process; that is, they must teach and learn everything on online platforms. This new way of learning environment postulates learners to adapt to some challenges they may encounter, which then, these challenges oppress the learners to adjust their learning strategies. In line with this, Oxford (1990) defined language learning strategies as the “specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations.” Therefore,

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learners must be able to adapt or change their language learning strategies to this new situation.

Kuama and Intharaksa (2016) summarized several relevant studies on online learning and learners' strategies. According to Shih (2005), successful learners demonstrated a more comprehensive range of strategies and showed a higher frequency of using metacognitive and cognitive strategies than unsuccessful learners. Liu & Feng (2011) discovered a positive correlation between metacognitive strategies and online learning behavior, as high-scoring learners utilized more metacognitive strategies than those with lower scores, and learners who spent more time learning online and taking online tests achieved better performance in final examinations. Additionally, Altunay et al. (2014) observed that learners occasionally employed language learning strategies in online settings but utilized effective strategies less frequently due to a perceived sense of relaxation and reduced tension compared to face-to-face classrooms. As mentioned earlier, effective language learning strategies emerge as a crucial factor in achieving successful outcomes in online language learning. Similarly, Chen et al. (2020) found that learners predominantly employed metacognitive strategies, followed by cognitive strategies, while affective strategies were less frequently used.

Online teaching and learning environments offer numerous benefits. However, it is essential to acknowledge that students taking online courses may face unique challenges they would not encounter in traditional offline classroom settings. These challenges can impact their overall learning experience and preference for online learning. One challenge online learners' face is the need for more social interaction and connection with peers. Tsai (2009) highlights that students may miss the opportunity to form friendships and engage in meaningful social interactions that are typically present in face-to-face classroom settings. This lack of social engagement can lead to feelings of isolation and reduced motivation to contribute to the learning process actively. Then, limited access to supervision is another challenge in online learning. Webster and Hackley (1997) argue that without immediate and direct access to instructors, students may experience difficulties receiving timely guidance and support. This can result in frustration and hinder their ability to seek clarification or assistance when needed. In addition, students may face psychological burdens in the online environment. Wirawati et al. (2022) point out that students may experience increased stress, anxiety, or a sense of detachment in online learning.

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Furthermore, Davies and Graff (2005) found that the absence of face-to-face interactions and immediate feedback in online learning environments can hinder students' academic performance and learning progress. Rianto (2021) also emphasizes that students' social and academic development may be compromised online, as they miss out on collaborative learning and social interactions inherent in traditional classrooms. The characteristics of students and the learning environment can also contribute to the challenges faced in online learning (Wirawati et al., 2022). Technological limitations, distractions at home, and difficulties in self-regulation and time management can further impede the learning process and hinder student success.

Then, in July 2021, the Indonesian government released a new policy about having limited face-to-face classroom interaction. The schools must have a limited number of students attending at a time and limited daily meeting hours. After that, in the middle of 2022, the COVID-19 pandemic can be said to be over or to the post-pandemic era. The transition from offline to online and back to offline learning significantly impacted students and teachers, necessitating quick adaptation and adjustments. Students and teachers had to acclimate to different modes of instruction and make necessary changes to their learning strategies to align with the new average era. The shift to online learning during the pandemic has influenced students' learning strategies. They had to adapt to virtual classrooms, utilize technology for communication and learning, and manage their time and resources effectively. However, returning to face-to-face learning, students had to readjust their strategies again. They needed to reacquaint themselves with traditional classroom dynamics, interact directly with peers and teachers, and adapt to the structured learning environment.

This current study tries to identify what Mathematics and Biology employ in language-learning mathematics and biology students learning English in online and offline classrooms. They have experienced online and face-to-face classroom interactions due to the Covid-19 pandemic. As ESP learners, English is not their major, and they might need help adjusting to the new situation. Hence, this study is intended to expand knowledge of how ESP learners of EFL deal with their strategies when they learn English in online and offline classrooms. Additionally, this study is intended to broaden the literature on language learning strategies in a foreign language context, especially about English for Specific Purposes learners in Indonesia.

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Furthermore, it is essential to note that language learning strategies can be learned, taught, and cultivated through training (Martinez, 1996). By acknowledging and being aware of these strategies, learners can actively engage in language learning, leading to increased efficiency and a positive learning approach (Hedge, 1993). The knowledge and application of learning strategies also significantly impact learners' motivation, self-efficacy, autonomy, and, ultimately, their language proficiency, thereby contributing to the overall goal of language learning. In particular, this study addresses the following research questions:

1. What language learning strategies are mathematics and biology learners employed in learning English during and after the COVID-19 pandemic?
2. Are there any similarities or differences between the two situations?

METHOD

Design

A comparative research method was chosen to meet the current study's objectives and answer the research questions. This method was conducted to accomplish a broader understanding of the use of language learning strategies by English for Specific Purposes (ESP) learners before and after the pandemic. As mentioned by Mokhtarianpour (2016), a non-experimental comparative study, as one of the quantitative approaches, is a methodological approach that involves analyzing phenomena and comparing them to identify both points of differentiation and similarity and is suitable to answer the research questions. This methodology compares groups or variables without manipulating independent variables or imposing interventions on the study participants. In this method, the researcher observes and analyzes existing groups or naturally occurring conditions to compare them. The primary focus is examining relationships, differences, or associations between variables of interest without directly controlling or manipulating those variables. In the current study, the comparative design allowed the researcher to compare the language learning strategies used by ESP learners during the pandemic and in the post-pandemic period. This analysis was crucial for understanding how the pandemic and subsequent changes in the learning environment may have influenced the participants' language learning strategies.

Participant

The participants of this study were 85 students from FKIP Lambung Mangkurat University majoring in Mathematics and Biology and learning English in their first and

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second terms. The decision to choose participants from those departments for this study is based on some reasons. First, the relevance to language learning, that is, the study aimed to investigate language learning strategies specifically within the context of Mathematics and Biology students. These students encounter discipline-specific language demands and terminology in their academic coursework, making their language learning experiences unique compared to students from other departments. Second, understanding how Mathematics and Biology students approach language learning can provide insights into the subject-specific challenges and strategies that may apply to other disciplines. Lastly, the choice of these departments is influenced by practical considerations, such as ease of access to participants. The researcher has established relationships or collaborations with these departments, making recruiting participants from within their academic network more convenient.

Instrument

This study employed Language Learning Strategies (LLS) from Oxford (1990) To answer the research questions, namely Strategy Inventory for Language Learning (SILL) as the instrument. This instrument has been widely used by other researchers (Liu & Feng, 2011; Royani et al., 2021; Sukying, 2021; Wirawati et al., 2022) to learn language learning strategies language learners use. Questions in the instrument postulate six learning strategies, namely Memory strategies (item number 1–9), Cognitive strategies (item number 10-23), Compensation strategies (24-29), Metacognitive strategies (item number 30-38), Affective strategies (item number 39-44), and Social strategies (item number 45-50). Each item is represented with a corresponding Likert scale between 1 and 5. Scale 1 means never or rarely true of me, Scale 2 is usually not true of me, Scale 3 is somewhat accurate, Scale 4 is usually true of me, and the last Scale 5 portrays consistently or almost always true of me.

Data collection

the questions are translated into *Bahasa Indonesia* and have been checked to avoid any ambiguity in wording and ensure content validity to ensure the participants understand and give unbiased answers. The instrument was given to the learners after they had the final test at the end of the first and second semesters. It means that they have experienced teaching English online for 14 meetings as required by the faculty and 14 meetings in an offline classroom setting. Therefore, they are suitable for the study, that is, to find out language

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learning strategies used in online and offline English classrooms or during and after the COVID-19 pandemic.

Data analysis

The current study utilized descriptive statistics to analyze the quantitative data obtained from the questionnaire. Descriptive statistics, such as means and standard deviations used in this study, were calculated for each language learning strategy based on the responses received from the participants. To answer the first research question, the researcher analyzed all answers from the questionnaire and verified what language learning strategies the Mathematics and Biology department learners used. Then, the results are summed to determine the frequency of language learning strategy usage among the participants and to rank the strategies based on their mean scores. The mean represents the average score of each strategy, while the standard deviation indicates the variability or dispersion of scores around the mean. The mean score of each language learning strategy is then ranked to determine which language learning strategy has higher or lower use. Strategies with higher mean scores were considered to have higher usage, while those with lower mean scores were deemed to have lower usage. The mean score was interpreted as in the range as follows (Oxford, 1990):

“3.5 - 5.0 = high use; 2.5 - 3.49 = medium use; 1.0 - 2.49 = low use.”

Meanwhile, to answer the second research question, that is, to find similarities or differences in language learning strategies applied by the learners, it is to rank the chosen strategies. The study could identify which strategies were commonly employed at varying levels among the participants by ranking the strategies and categorizing them based on their mean scores. In addition, it can also be seen whether there are any similarities or differences among the usages during and after the Covid-19 pandemic. Along with this study, the author employs referencing manager called” Offline automatic system by using Mendeley Desktop (MD) “ as proposed by a scholar (Turmudi, 2020,p.59).

RESULT AND DISCUSSION

Result

Language learning strategies employed by Mathematics and Biology learners in learning English during the pandemic and after the pandemic of Covid-19

The tables below show the mean scores and standard deviations of language learning strategies used by ESP learners of Mathematics and Biology during and after the COVID-19

pandemic. From the tables' results, it can be inferred that all learners in the Mathematics and Biology departments employed all strategies in their learning: metacognitive, memory, compensation, cognitive, affective, and social strategies. Additionally, using those strategies is considered a medium in both situations.

Table 1. The rank of language learning strategies used during the pandemic of covid-19

Rank	Language Learning Strategies	Mean	Standard Deviation	Strategy Use
1	Metacognitive	3,737	3,336	High
2	Memory	3,433	3,053	Medium
3	Compensation	3,380	3,018	Medium
4	Cognitive	3,370	2,994	Medium
5	Affective	3,157	2,927	Medium
6	Social	2,961	2,712	Medium
Overall SILL		3,340	3,007	Medium

Table 1 presents a ranking of language learning strategies in a specific order. Notably, students in the Biology and Mathematics Departments employed various language learning strategies throughout their online courses, although their usage level remained moderate. The Metacognitive Strategy was the most frequently used strategy during that period, while the other strategies were classified as medium-level. The Memory Strategy ranked second ($\bar{x} = 3.433$), followed by the Compensation Strategy ($\bar{x} = 3.380$), Cognitive Strategy ($\bar{x} = 3.370$), Affective Strategy ($\bar{x} = 3.157$), and Social Strategy ($\bar{x} = 2.961$), which was the least frequently utilized.

A slight difference was observed upon analyzing the mean scores among the medium-level users of these strategies. The scores between one strategy and another were somewhat divergent. It is worth noting that Social Strategy had the fewest users, likely due to the shift to online meetings.

Table 2. The rank of language learning strategies used after the pandemic of covid-19

Rank	Language Learning Strategies	Mean	Standard Deviation	Strategy Use
1	Metacognitive	3,802	3,264	High
2	Memory	3,774	3,235	High
3	Cognitive	3,569	3,028	High
4	Social	3,314	2,769	Medium
5	Compensation	3,216	2,669	Medium
6	Affective	2,804	2,249	Medium
Overall SILL		3,413	2,869	Medium

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The results depicted in Table 2 reveal that students employed all types of offline learning strategies. However, three strategies were utilized more frequently: the Metacognitive Strategy ($\bar{x} = 3.802$), the Memory Strategy ($\bar{x} = 3.774$), and the Cognitive Strategy ($\bar{x} = 3.569$). Notably, the Metacognitive Strategy had the highest number of users. On the other hand, the Social Strategy ($\bar{x} = 3.314$), Compensation Strategy ($\bar{x} = 3.216$), and Affective Strategy ($\bar{x} = 2.804$) were moderately used by the students. Considering the overall scores derived from the mean scores, the Biology and Mathematics department students can be categorized as medium users, even in the post-pandemic situation of COVID-19.

Similarities or differences of language learning strategies employed by Mathematics and Biology learners in learning English during the pandemic and after the pandemic of Covid-19

The above tables illustrate commonalities and distinctions in language learning strategies employed by Mathematics and Biology students before and after the COVID-19 pandemic. From the mean scores shown in Table 1 and Table 2, before and after the COVID-19 pandemic, it can be inferred which language learning strategies got the highest and the lowest usage. The tables show that the shared aspect between the two groups is their utilization of metacognitive and memory strategies in both situations as the first and the second rank of users. Additionally, the students from both disciplines were considered medium-level strategy users, indicating that they frequently utilized language learning strategies. These strategies likely contribute to students' abilities to monitor their language learning progress, manage their study habits, and employ effective learning techniques regardless of the pandemic's presence.

However, notable differences emerge when examining the rank of other strategies used by the two groups. The most significant variation lies in the order of these strategies, indicating that while both Mathematics and Biology students employ similar metacognitive and memory approaches, they prioritize different supplementary strategies to complement their language learning journeys. During the pandemic, the students employed compensation, cognitive, affective, and social strategies after metacognitive and memory strategies. Meanwhile, after the pandemic, the students in both disciplines applied cognitive, social, compensation, and affective strategies. This also implies how students adapt their language learning behaviors during and after such periods, which can inform educational strategies to address the challenges and opportunities presented by disruptive events.

Discussion

The recent findings indicate that learners in the ESP course actively utilized language learning strategies, regardless of whether the meetings were conducted online or offline. During the COVID-19 pandemic, when meetings shifted online, students from the Biology and Mathematics departments employed all language learning strategies, although they were categorized as medium users. In online settings, metacognitive and memory strategies were the most frequently employed, while social strategies were utilized the least. However, in offline meetings or after the COVID-19 pandemic, the metacognitive and memory strategies retained their highest ranking among the users, while the affective strategy had the lowest ranking. Therefore, a notable similarity observed in this study is that learners from both departments, whether online or offline, prioritized using metacognitive and memory strategies over other language learning strategies. However, the differences lie in the rankings of the remaining strategies following the metacognitive and memory strategies. Therefore, these results highlight the students' consistent application of language learning strategies in their English language learning endeavors, despite the differences in strategy rankings between during and post-pandemic periods.

In both situations, the metacognitive strategy consistently ranked as the most widely used strategy among the learners. This strategy is crucial in assisting students in organizing, planning, and evaluating their language learning process. Learners can self-evaluate by setting clear learning goals, monitoring their progress, and assessing their understanding and knowledge (Dewi et al., 2018; Hashimoto et al., 2019). This empowers them to take ownership of their learning and adapt their approach as needed. The metacognitive strategy allows learners to personalize their learning experience by creating a conducive environment, managing their time effectively, and finding engaging resources to facilitate their studies.

Renowned researchers support the significance of the metacognitive strategy in language learning. (Oxford, 1990; Rianto, 2021) Highlight the importance of employing metacognitive methods to enhance language learning effectiveness. Royani et al. (2021) emphasize its role as a core component of higher-order thinking skills. Then, (Abdelrahman, 2020; Abendroth & Richter, 2021) emphasize that the metacognitive strategy helps students learn more. These scholars emphasize the relevance and benefits of incorporating metacognitive strategies into language learning practices.

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At the university level, it is no surprise that students continue to utilize the metacognitive strategy during and after the Covid-19 pandemic. As adult learners, they possess a deeper understanding of the importance and relevance of their studies. They demonstrate awareness and control over their learning process, actively seeking ways to overcome challenges and achieve their learning objectives. Despite their challenging circumstances, employing a metacognitive strategy allows these students to remain focused and determined in their pursuit of language proficiency. In summary, university students' consistent utilization of the metacognitive strategy underscores its effectiveness in facilitating language learning. By employing this strategy, learners ensure that their learning objectives are met while gaining greater control over their learning process.

This study's findings contrast the research conducted by (Romani et al., 2021; Sukying, 2021), in which the effective strategy ranked as the highest used by learners during the Covid-19 pandemic. In the case of their studies, even though the classes were conducted online, students demonstrated a preference for the effective strategy. This preference could be attributed to the opportunity to engage in group discussions and virtual meetings, allowing them to connect and interact with their peers. The study participants may have been more familiar with each other and maintained regular communication, even while physically isolated at home. This established connection and continued social interaction could have contributed to the prominence of the affective strategy among those learners.

On the other hand, the students in the Biology and Mathematics Departments in the current study were in their first semester. They needed to gain prior knowledge of or familiarity with their classmates. Additionally, during the COVID-19 pandemic, students may have experienced increased stress and anxiety due to the challenges brought about by the situation. This could have shifted their focus toward strategies prioritizing individual learning and coping mechanisms, such as the metacognitive strategy, rather than social interactions (Chen et al., 2020).

However, the current study's findings align with the results from Marlin et al. (2022), particularly regarding the utilization of the metacognitive strategy during online learning. They found that most students employed metacognitive strategies to center their learning process, organize their learning strategies, and plan their approach to learning. Next, social, memory, affective, and compensation strategies were identified as the subsequent strategies in terms of usage, indicating their relatively lower frequency of implementation among students.

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This parallel suggests a consensus regarding the prevalence of these strategies during online learning environments.

In contrast, when the meetings shifted to offline, social strategy ranked fourth with a mean score of 3,314, placing it in the medium category. This suggests that learners are already engaged in social activities with their peers to some extent, such as participating in group discussions and language exchanges (Wei et al., 2021; Royani et al., 2021). On the other hand, the affective strategy remained the least employed in the post-pandemic period. Affective strategies focus on regulating and harnessing learners' emotions to create a positive and supportive learning environment (Sukyng, 2021). This strategy exists, and the lowest probably happened for some reason. Though the students have already socially interacted with their peers, they have not had some emotional connections or personal engagement for such a short time, and this diminishes the importance of affective aspects in the language learning process (Sitzmann et al., 2010). Second, the challenges and disruptions caused by the pandemic, such as social distancing measures and increased stress levels, might have impacted learners' emotional states and reduced their focus on practical strategies. The uncertainties and anxieties associated with the pandemic may have overshadowed the affective aspects of language learning for some individuals (Rianto, 2021). Additionally, the nature of the post-pandemic situation, which likely involved a transition back to offline meetings, shifted learners' priorities toward other more relevant strategies in face-to-face interactions. The need to reestablish social connections and adapt to the new learning environment may have temporarily weakened the emphasis on practical strategies (Sitzmann et al., 2010; Crawford-Ferre & Wiest, 2012).

Indeed, the current study's findings align with Alqahtani & Alhebaishi's (2010) research on English for Specific Purposes (ESP) regarding the prominence of the metacognitive strategy and the lowest usage of the affective strategy. Although not conducted in a post-pandemic context, their study revealed similar patterns in language learning strategies. The metacognitive strategy consistently emerged with the highest number of users, indicating its significance in language learning. On the other hand, the affective strategy was found to have the fewest users, suggesting its comparatively lower utilization among learners. It is worth noting that while the overall pattern of strategy usage corresponds to Alqahtani and Alhebaishi's (2010) findings, the specific ranking or order of other strategies differs between the two studies. This difference in ranking could be attributed to various factors, including the

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specific context of language learning, the nature of the participants, and the distinct circumstances surrounding the studies. Nevertheless, the general trend of high utilization of the metacognitive strategy and relatively lower usage of the affective strategy remains consistent.

Furthermore, the results indicate that students in the Biology and Mathematics Departments consistently utilized various online and offline learning strategies, demonstrating their flexibility and adaptability in enhancing their language learning experiences. It is worth noting that despite the transition to online and offline learning prompted by the COVID-19 pandemic, the students remained actively engaged with language learning strategies. This highlights their resilience in adapting to new learning environments and their commitment to achieving successful language acquisition. Moreover, the prevalence of the metacognitive strategy during and after the pandemic suggests its significant role in fostering students' metacognitive development and enhancing their overall language learning outcomes. The moderate usage of other strategies, including the memory, cognitive, social, compensation, and affective strategies in online and offline learning, although in a different order, further supports the notion that students employed a well-rounded approach to language learning. The varied utilization of language learning strategies underscores the importance of equipping students with diverse strategies to navigate different learning contexts effectively. By employing these strategies, students can optimize their language learning experiences and achieve successful language acquisition outcomes.

CONCLUSION

Conclusion

Learners of mathematics and biology continue to use language learning strategies during and after the COVID-19 pandemic because they think that language is fundamental for communication, education, career opportunities, and personal enrichment. The methods and tools for language learning may have evolved due to the pandemic, but the underlying motivations for learning languages persist. Some similarities and differences can be drawn from language learning strategies observed during and after the COVID-19 pandemic. First, metacognitive strategies are consistently prominent; the findings indicate that metacognitive strategies, which involve planning, managing, and monitoring one's learning process, were widely utilized by students during and after the pandemic. This suggests that learners were

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aware of the importance of self-regulation and actively sought ways to enhance their learning experience. Second, the use of social strategies showed some variations. During the pandemic, the social strategy was moderately employed, likely due to the limitations of face-to-face interaction. However, after the pandemic, the use of this strategy decreased, possibly due to a return to traditional classroom settings and reduced reliance on virtual communication platforms. Next, affective strategy had lower usage, which involves managing emotions, motivation, and attitudes toward language learning, and was reported to have lower usage during both the pandemic and post-pandemic periods. This suggests that students may have struggled to maintain emotional well-being and motivation during these disruptive times.

Limitation

However, this study has some limitations, namely the absence of an investigation into the correlation between language learning strategies used by different genders from each department and the need for more exploration of their language proficiency levels. Therefore, the study's conclusions might need to fully account for the nuanced relationships between these variables, varying across different departments, educational settings, and cultural contexts. By addressing these limitations, future studies can provide valuable insights into gender-based differences in language learning and fill the gaps in our understanding of how language proficiency contributes to developing more inclusive and effective language learning practices.

Implication

Overall, the findings suggest that learners adapt their language learning strategies in response to the unique circumstances presented by the pandemic. While metacognitive strategies remain important throughout, other strategies, such as social and affective strategies specifically, may be influenced by the availability of face-to-face interactions and the challenges associated with maintaining emotional well-being. These conclusions highlight the importance of supporting learners in developing diverse strategies and providing resources to effectively navigate the changing learning environments.

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