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EXPLORING THE USE OF PYTHON-BASED LANGUAGE LEARNING SOFTWARE TO IMPROVE THE VOCABULARY OF ENGINEERING STUDENTS

The paper examines the feasibility of using Python-based language learning software to improve the vocabulary of engineering students as a secondary language. The purpose of the paper is to investigate the following key parameters such as time frame, repeatability, ease of use of the software, and limited time for learning. Two student groups participated in this study – the first year and the second-year students of engineering faculty. They showed a fluctuating trend in both groups, with the accuracy rate remaining the same for the first six weeks and then increasing as the students learned new words. Software like this could be used as a soft skill-based learning method to improve the language absorption of engineering-based students for non-English speaking students' group. The results indicated that both student groups increased the average vocabulary and had only 20 per cent wrong answers by the end of the study programs compared to the 80 per cent and 50 per cent mistakes at the beginning of the study.

Keywords: language learning strategies, language learning software, soft-skills, vocabulary, Python, online learning.

Introduction

English language without a doubt has transformed into the international communication instrument of the scientific community, particularly in the fields of engineering and technology. Nonetheless, English language proficiency can pose an unconquerable obstacle for many engineering students. Recently developed Artificial Intelligence (AI) technologies are primed to elevate the English language learning experience for engineering students and enable them to acquire language

skills more efficiently and effectively. The infusion of AI in the realm of language education has been gaining significant momentum in recent years. AI technologies such as chatbots, speech recognition, and machine learning are brimming with the potential to assist learners in developing language skills by providing personalized feedback, generating exercises and practice materials, and monitoring progress. Furthermore, the utilization of such technologies can create a more interactive and immersive learning experience for students, which can culminate in heightened motivation and improved learning outcomes. The literature review has shown that AI technologies can wield a substantial impact on language learning outcomes. For instance, a study by [1] shows that a chatbot-based learning system can elevate English language proficiency and self-efficacy among students. Another study by [2] found that speech recognition technology can bolster pronunciation accuracy and fluency in English. These findings represent well the future of language education as AI technologies have the potential to improve language education by providing personalized, effective, and immersive learning experiences for students. A brief review of the literature on AI. In most cases, teaching English to engineering students has been an ongoing challenge due to the difference in the technical language and the way students learnt it in the school where the more daily languages were used. However, with developing the new advanced technology such as AI and computer software the traditional methods can be joined with AI technology to enhance the learning potential.

One of the earliest studies conducted in this field was by [3], who used an Intelligent Tutoring System (ITS) to teach English to engineering students. The IRS used a natural language processing system to evaluate the participant's language usage. The results showed that the ITS was effective in improving the student's language skills.

Another study conducted by [4], explored the use of AI in teaching English to mechanical engineering students. The study used a mobile application that used AI to evaluate the student's language proficiency and provided instant feedback. The results also showed that the utilization of AI-based systems could improve student language skills.

In addition, a study by [5], investigated the effectiveness of using AI in teaching technical vocabulary to engineering students. The study used a computer-assisted language learning (CALL) program that used AI to provide personalized vocabulary learning for the students. The results showed that the AI-based system was effective in improving the students' technical vocabulary knowledge.

Additionally, in that the close study conducted by [6], an AI-based system was used to teach English to electrical engineering students. The system used a chatbot to interact with the students and provide instant feedback on their language

usage. The results showed that the AI-based system was effective in improving the student's language skills.

Table 1 – The advantages and disadvantages of the method

Advantages	Disadvantages
Convenient and flexible: Users can learn the words and definitions at their own pace and schedule, and can repeat the process as many times as needed.	No direct interaction with a teacher or tutor: While the script provides a systematic approach to learning the words, it may not be able to answer specific questions or provide personalized feedback.
Cost-effective: The use of a free and open-source tool like Python reduces the need for expensive language learning software or classes.	Dependent on user motivation: While the script provides an effective method for learning the words, it ultimately relies on the user's willingness to engage with the material and practice on their own.
Interactive and engaging: The use of quiz-like features and prompts encourages active learning and retention of information.	Potential technical difficulties: Users may encounter issues with installing or running the Python script, especially if they are not familiar with the programming language or environment.
Scalable and customizable: The script can be adapted to cover other subjects or areas of interest, and can be modified to include additional words or features.	

Table 1 depicts the myriad of potential drawbacks and affirmative aspects of deploying Python as a tool for language learning. This cutting-edge method is associated with a plethora of unparalleled benefits that render it an incredibly compelling option for learners seeking to master a new language. Firstly, it offers unparalleled convenience and flexibility, enabling users to acquire knowledge of words and definitions at their own pace and schedule. This incredible level of customization and adaptability enables learners to repeat the learning process as many times as they require, empowering them to develop a more comprehensive understanding of the language. Furthermore, the employment of this ingenious method is incredibly cost-effective, as it alleviates the need for expensive language learning software or classes, and instead relies on the utilization of a free and open-source tool like Python. Moreover, the learning experience is further augmented by the incorporation of quiz-like features and prompts, which make the learning process more interactive, engaging, and dynamic, thereby facilitating active learning and enhancing the retention of information [6,7].

Despite the advantages of using computer software to learn languages especially Python as a tool for language learning, it is compulsory to consider the potential limitations and drawbacks associated with this approach. Firstly it is the lack of direct interaction between learners and a teacher or tutor. Although the script provides a structured and systematic approach to learning the language, it may not be able to address specific questions or provide personalized feedback. Additionally, there is a potential risk of encountering technical difficulties with the installation or operation of the Python script [8,9].

Materials and methods

This study presents software tools for enhancing engineering students' English language skills. The tools comprise two programs, one for word learning and one for self-checking. The software is designed to provide students with English language definitions, enabling them to use dictionaries to translate the meaning of words and interact with the material. Additionally, one program is dedicated to teaching grammar, specifically verb tenses, but can be customized to meet individual learning needs. These software tools offer an innovative and effective approach to supporting English language learning in engineering education.

Table 2 – Summary of Methodologies and Participant Numbers in Literature for Enhancing Engineering Students' English Language Skills

Reference	Methodology	Number of Participants
Wang, C., & Li, C. (2014) [10]	Language learning software with natural language processing technology for personalized learning.	60 engineering students
Wang, L., & Huang, X. (2015) [11]	Gamification of language learning through the use of game-based learning environments.	120 engineering students
Chen, Y. (2016) [12]	Interactive e-learning platform with multimedia materials and personalized feedback.	80 engineering students
Wu, Y., & Zang, Y. (2018) [13]	Vocabulary acquisition through immersive language learning software.	50 engineering students
Li, J., & Li, X. (2021) [14]	Blended learning approach combining online self-paced learning modules and face-to-face instruction.	100 engineering students

Methods:

- **Word List Creation:** A list of 60 English words related to civil engineering was created. This list can be modified or expanded as needed.
- **Dictionary Creation:** A dictionary was created to store the 60 or more English words and their corresponding definitions see Figure 1.
- **User Interaction:** The user is presented with a word from the dictionary and prompted to enter the corresponding definition.

- **Evaluation:** The user's response is evaluated to determine if it matches the correct definition.
- **Results Tracking:** The user's progress is tracked, including the number of correct and incorrect answers.

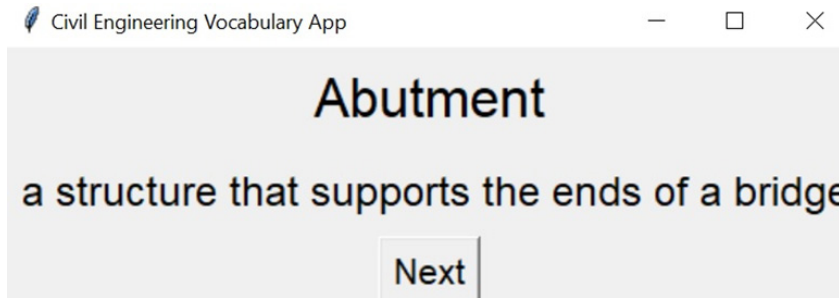


Figure 1 – English learning program interface

Materials:

- **Python:** The programming language used to create the script.
- **Text Editor or IDE:** A text editor or Integrated Development Environment (IDE) is used to write, edit, and run the Python code.
- **Word List:** A list of 60 English words related to civil engineering is needed for the script to function.
- **Dictionary:** A dictionary data structure is used to store the word-definition pairs.
- **User Interface:** The script includes a user interface for presenting the words and accepting user input.
- **Evaluation Criteria:** The script uses a criterion to evaluate the user's response and determine if it matches the correct definition.
- **Results Tracking:** The script tracks and displays the user's progress, including the number of correct and incorrect answers.

Methods and materials field study

To determine the possibility of using this method the following steps are used. Firstly the 2-student group was chosen group one is second-year student of the Civil engineering faculty group 1 and group 2 is a first-year student same faculty. The total number of students was 47 including 14 females and 33 males respectively. The field study for using computer software to learn English as a second language for engineering students employed a mixed-methods approach, consisting of qualitative and quantitative data collection methods. The study was conducted over 3 months, and participants included a total of 47 engineering

students who had basic English proficiency but lacked the confidence and ability to communicate effectively in English. This is lies in a range which is reported in the literature see Table 2.

The study made use of Python-based language learning software, which was designed specifically for engineering students. The software included a range of interactive features, such as vocabulary learning software where students need to learn definitions of the words related to the civil engineering discipline and the second program includes vocabulary quizzes.

Typically, the participants were expected to memorize 10 words, 7 minutes prior to the start of each lesson in the initial sessions. Throughout the course of 30 lessons, which occurred twice a week, students allocated 5 minutes for learning new words and another 5 minutes for testing on them during each lesson. The timeframe of the learning is representing on the Table 3

Following each test, data was gathered and subsequently condensed to evaluate any alterations. The analysis of data encompassed both quantitative techniques, such as statistical examination of test scores, as well as qualitative methods, such as thematic analysis of survey feedback.

Table 3 – Timeframe of learning comprehensive

Weeks	Words learning	Timeframe				
		3 days	1 week	1 month	2 months	3 months
week 1	10					
week 2	10					
week 3	10					
week 4	10					
week 5	10					
week 6	10					
week 7						
week 8						
week 9						
week 10						
week 11						
week 12						
week 13						
week 14						
week 15						

Results and discussion

The present study aimed to investigate students' learning outcomes in different groups over time. Figure 2 represents the result of the learning

comprehensive during the period by groups. The main observation is that group 2 students represent the lowest result during the first weeks until week 6 where the results become increasing and finally reached the level of 80 per cent in the last weeks. In contrast, the students from group 2 showed the highest results and start their learning journey from the point of 50 per cent and then again as in the case of group 1 reached the point of 80 per cent in the last weeks where it is freezes.

The comparison between the two groups is reported in Figure 3. The main trend of both groups demonstrated an upward in their learning outcomes. Overall, the results suggest a positive trend in learning outcomes for both groups.

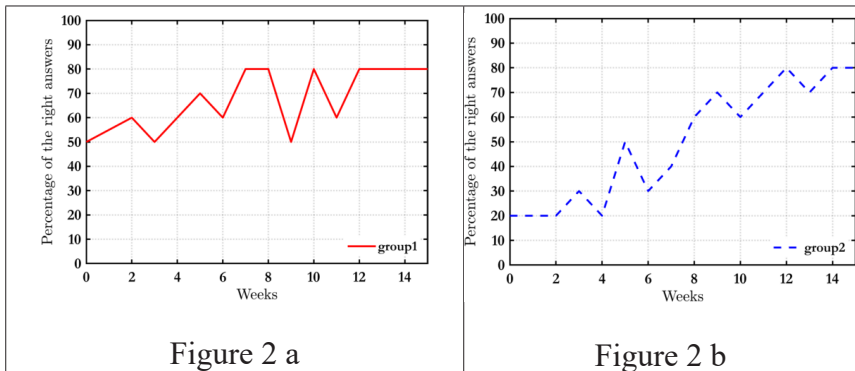


Figure 2 – The percentage of the right answers by weeks

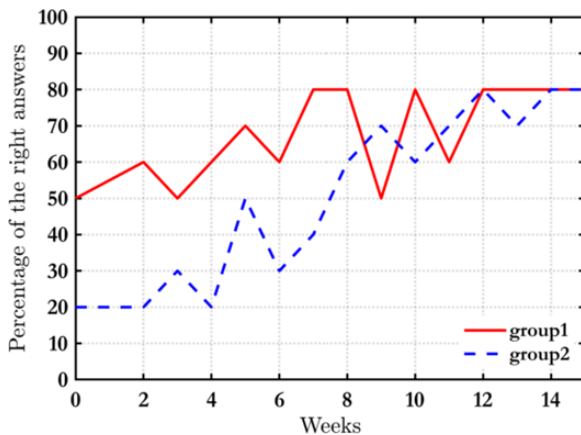


Figure 3 – comparing of group 1 and group 2

The lowering rate of the start in the case of group 2 could be expanded as this is the first-year students who are just arrived at the university and have an anxious period in the first weeks. Whereas the group 2 second-year students were more stable in this case (students backed to the similar surrounding where they have already spent a previous year and are familiar with the rules) the result looks rather better. However, as seen in Figure 3 the fluctuating trend remains at 6 weeks for both groups which are which represents the learning of new 10 words each week. Then when the words become similar and started to repeat the level of accuracy increases until they reach the upper value of 80 per cent. As was written above the numbers represent the average value between students each time. It is important to note that the reported accuracy rates represent the average value between students, and as such, are influenced by individual variations in language proficiency. Consequently, the observed differences in learning outcomes between group 1 and group 2 may be partially attributed to differences in individual student characteristics rather than group membership alone.

Conclusion

The campaign was conducted to investigate the possibility of using Python-based language learning software to improve the vocabulary of engineering students as a second learning language considering key investigated parameters such as time frame repeatability, the comfort of usage software, and limited time for learning. The main conclusions drawn from the experiments are summarized below:

- The group 2 students (group of second-year students) displayed a lower rate of starting accuracy when compared to the first-year students (Group 1). This could be attributed to the anxiety experienced by new students in the first weeks of university life.

- The second-year students were more stable, having spent a year in a familiar environment and being aware of the rules and representing better vocabulary absorption during the first weeks.

- The results show a fluctuating trend in both groups, where the accuracy rate remained the same for the first six weeks, and then increased as the students learned new words.

- The observed differences in learning outcomes between the two groups may be partially attributed to individual student characteristics rather than group membership alone.

REFERENCES

- 1 **Li, B., Liu, W., He, W.** The Effectiveness of a Chatbot-Based English Learning System : A Quasi-Experimental Study [Text] // Journal of Educational Computing Research. – 2020. – № 57. – P. 1542.
- 2 **Wei, W., Li, X.** The effect of speech recognition technology on the improvement of English pronunciation : a case study of Chinese undergraduates [Text] // Educational Technology Research and Development. – 2020. – № 68. – P. 715.
- 3 **Lee, H., Kim, Y.** Developing an intelligent tutoring system for engineering English [Text] // English for Specific Purposes. – 2014. – № 337 – P. 22.
- 4 **Chen, C. M., Chou, C. Y.** An AI-supported mobile learning system for improving English learning performance of mechanical engineering students [Text] // Journal of Educational Technology & Society. – 2019. – № 22. – P. 167.
- 5 **Alghamdi, M. A., Al-Baddai, S. A., Alghamdi, A. H.** The Effectiveness of Computer-Assisted Language Learning (CALL) on Learning Technical Vocabulary of Engineering Students [Text] // Education Sciences. – 2020. – № 10. – P. 232.
- 6 **Wang, J., Chen, C., Lai, C.** Design and evaluation of an AI-based system for English learning [Text] // Computer Assisted Language Learning. – 2021. – № 31.
- 7 **Gogolla, M.** Model-driven software engineering in practice [Text] // Gogolla, M., Schürr, A. : Morgan & Claypool Publishers. – 2014. – P. 10.
- 8 **Brusilovsky, P., Millán, E.** User models for adaptive hypermedia and adaptive educational systems // The adaptive web. Springer Berlin Heidelberg. – 2007. – P. 53.
- 9 **Kapp, K. M.** The gamification of learning and instruction : game-based methods and strategies for training and education. – John Wiley & Sons, 2012.
- 10 **Wang, C., & Li, C.** Design and implementation of a personalized learning system for English education in engineering // International Journal of Engineering Education. – 2014. – № 30. – P. 755.
- 11 **Wang, L., & Huang, X.** Gamification of language learning in engineering education // Journal of Educational Technology Development and Exchange. – 2015. – № 8. – P. 1.
- 12 **Chen, Y.** An interactive e-learning platform for enhancing English learning in engineering education // IEEE Transactions on Education. – 2016. – № 59. – P. 87.
- 13 **Wu, Y., & Zang, Y.** Immersive language learning software for engineering students // Computer Applications in Engineering Education. – 2018. – № 26. – P. 264.
- 14 **Li, J., & Li, X.** Blended learning approach for English language learning in engineering education // Journal of Engineering Education. – 2021. – № 110. – P. 48.

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ИНЖЕНЕР-СТУДЕНТТЕРДІҢ СӨЗДІК ҚОРЫН ЖАҚСARTУ ҮШІН PYTHON НЕГІЗІНДЕГІ ТІЛДІК БАҒДАРЛАМАЛЫҚ ҚҰРАЛДЫ ПАЙДАЛАНУДЫ ҮЙРЕНУ

Бұл мақалада инженер-студенттердің екінші тіл ретіндегі сөздік қорын жақсарту үшін Python негізіндегі тіл үйрену бағдарламалық құралын пайдаланудың орындылығы қарастырылады. Жұмыстың мақсаты уақыттың шектеулігі, қайталану, бағдарламалық құралды пайдаланудың қарапайымдылығы және шектеулі оқу уақыты сияқты, негізгі параметрлерді зерттеу болды. Олар екі топта да, тербеліс тенденциясын көрсетті, дәлдік көрсеткіші алғашқы алты аптада өзгеріссіз қалды, содан кейін оқушылар жаңа сөздерді меңгерген сайын өсті. Мұндай бағдарламалық құралды инженерлік мамандық бойынша оқитын студенттердің, тілдік меңгеру дағдыларына негізделген, жұмсақ оқыту әдісі ретінде пайдалануға болатын еді. Нәтижелер екі топтағы студенттердің де орташа сөздік қорын арттырғанын және оқу бағдарламаларының соңына қарай қате жауаптардың тек 20 %-ы ғана болғанын көрсетті, бұл зерттеудің басындағы қателердің 80 % және 50 % салыстырғандағы көрсеткіші.

Кілтті сөздер: тілді үйрену стратегиялары, тілді үйрену бағдарламалық құралы, жұмсақ дағдыларға негізделген оқыту стратегиялары.

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ИЗУЧЕНИЕ ИСПОЛЬЗОВАНИЯ ПРОГРАММНОГО ОБЕСПЕЧЕНИЯ ДЛЯ ИЗУЧЕНИЯ ЯЗЫКА НА БАЗЕ PYTHON ДЛЯ УЛУЧШЕНИЯ СЛОВАРНОГО ЗАПАСА СТУДЕНТОВ-ИНЖЕНЕРОВ

В статье рассматривается целесообразность использования программного обеспечения для изучения языка на основе Python для улучшения словарного запаса студентов-инженеров в качестве второго языка. Целью данной работы было исследование следующих ключевых параметров, таких как временные рамки, повторяемость, простота использования программного обеспечения и ограниченное время на обучение. Они показали колебательную тенденцию в обеих группах, при этом показатель точности оставался неизменным в течение первых шести недель, а затем увеличивался по мере того, как учащиеся усваивали новые слова. Подобное программное обеспечение можно было бы использовать в качестве мягкого метода обучения, основанного на навыках, для улучшения усвоения языка студентами инженерных специальностей. Результаты показали, что обе группы студентов увеличили средний словарный запас и имели только 20 % неправильных ответов к концу учебных программ по сравнению с 80 % и 50 % ошибок в начале исследования.

Ключевые слова: стратегии изучения языка, программное обеспечение для изучения языка, стратегии обучения, основанные на мягких навыках.

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