

Research Article

Application of Mobile Technology in College English Vocabulary Teaching

Bing He 

College of Foreign Language, Dalianjiaotong University, Dalian 116021, Liaoning, China

Correspondence should be addressed to Bing He; rachelhe2008@djtu.edu.cn

Received 8 December 2021; Revised 31 December 2021; Accepted 3 January 2022; Published 16 February 2022

Academic Editor: Naeem Jan

Copyright © 2022 Bing He. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

In order to improve the quality of college English vocabulary teaching, this paper studies the application of mobile technology in college English vocabulary teaching. The advantages of mobile technology are analyzed, and different mobile technology communication deployment schemes are determined according to different needs and environments of English vocabulary learning, so as to build a college English vocabulary teaching system, which is mainly composed of the user layer, mobile network layer, and English vocabulary data layer. Among them, the main functions of the user layer are user login, system information setting, English vocabulary resource browsing, uploading English vocabulary homework, etc., and determine user preference data through user logs. The mobile network layer is designed using mobile technology to create the delay control technique of the system mobile communication, and the system mobile network layer's LAN is set up to increase data transmission speed. Finally, set up the database according to the English vocabulary of English words field, calculating Euclidean distance to determine the relationship between them, and then through random set classification vocabulary data types, calculate the similarity degree of the data extraction vocabulary data characteristics and remove high similarity of the English vocabulary data to reduce the difficulty of system storage. The experimental findings suggest that the mobile technology-based system has high performance and dependability and may be widely used in practice.

1. Introduction

With the continuous development of computer technology, mobile technologies such as multimedia and network technology are widely used in many fields. Among them, the mobile technology industry is widely used in the field of education [1]. This technology is also used in college English vocabulary education. The application of mobile technology has greatly promoted the teaching efficiency of education and provided great convenience for students of different majors. Among them, personal learning environment and virtual classroom built through the wireless network in mobile technology have become important ways to improve learners' learning interest [2]. Due to the special structure of knowledge in college English vocabulary teaching, students are often not interested, which affects students' performance and the application of employment English in the future. Moreover, only vocabulary learning in the classroom is far

from enough. Through the application of mobile technology, we can continuously expand the vocabulary and learning time of English learning [3]. Although more interactive teaching methods have been used in English vocabulary teaching in recent years, students' vocabulary learning and vocabulary resources cannot be well transformed when they leave the classroom [4]. Therefore, using mobile technology to promote the quality of college English vocabulary teaching and provide students with more mobile English vocabulary resources has become a hot issue in current research.

Cui [5] proposed a computer intelligent proofreading system for English translation. The system is applied to college English vocabulary teaching to help students effectively improve the accuracy of vocabulary translation. The system pays much attention to the translation of English phrases and words. The core meaning of words is derived from the search module, and the user habits are established

with the assistance of the log module, thanks to the design of the intelligent proofreading module, search module, translation module, and occasional log module. The phrase translation model is enhanced in the software design, the model is used to identify the proper meaning of English vocabulary translation, and the system design is finished. The system's architecture increases the quality of English vocabulary translation and assists students in correcting learning faults. However, this strategy takes into account a smaller amount of English vocabulary and has several drawbacks that need to be addressed. A machine learning-based English vocabulary adaptive learning approach is proposed in [6]. In the model design, machine learning is used. To identify the main parameter likelihood of English vocabulary, a dynamic modeling learning technique is used. The learning fitness of English vocabulary is matched via various determinations, the fitness is continually changed, and the adaptive process of English vocabulary learning is decided using the AdaBoost algorithm. This method mainly considers the learning adaptability of users, does not fully realize the application of mobile technology, and considers less about the extraction of English learning vocabulary and features, so it has some limitations. Yuan and Huang [7] proposed a semantic feature extraction and translation method based on the graph regularization algorithm. This method studies the errors in English vocabulary translation. With the help of the graph canonical nonnegative matrix decomposition method, the features of English vocabulary are extracted, the digraph of extracted data is constructed, and the accuracy of English vocabulary translation is determined according to the digraph. This method improves the accuracy of vocabulary translation by analyzing the hidden features of English vocabulary. However, there are some limitations in the application of this method in English vocabulary teaching. Due to the noise of vocabulary characteristics, translation errors in learning are caused.

In order to solve the shortcomings of the above methods, this paper applies mobile technology to college English vocabulary teaching in order to enhance students' interest in learning. This article examines the benefits of mobile technology and how it is used to teach vocabulary to improve the quality of the college English vocabulary instruction.

2. Application of Mobile Technology in College English Vocabulary Teaching

A college English vocabulary teaching system based on mobile technology is built in this research to increase the impact of college English vocabulary teaching. First, the benefits of mobile technology are examined in the system design. The general architecture of the college is built on this foundation. English vocabulary teaching system is designed. Based on this architecture, the system hardware and software are designed to complete the application research of mobile technology in college English vocabulary teaching.

2.1. Mobile Technology Analysis. Mobile technology includes mobile communication technology and terminal equipment. In the English vocabulary teaching system, the main mobile technologies supporting the system's operation include wireless communication and cellular mobile communication systems. Mobile technology is the basis of English vocabulary learning and application. Different mobile technologies are applied according to different English vocabulary learning needs and learning environments to determine different mobile technology communication deployment [8]. The mobile communication deployment mode selected in the college English vocabulary teaching system in this paper is shown in Table 1.

In the design of the college English vocabulary teaching system, this paper mainly applies the cellular mobile network, which is widely used in multinetworks and can realize effective communication. According to the mobile technology analyzed above, the college English vocabulary teaching system environment constructed in this paper should maintain integration [9], support college English vocabulary learners to learn autonomy and uniqueness, and provide them with a more effective virtual learning system [10]. The basic framework of the college English vocabulary teaching system based on mobile technology is shown in Figure 1.

2.2. Functional Module Design of the College English Vocabulary Teaching System. In the design of the college English vocabulary teaching system, the system user layer, mobile network layer, and English vocabulary data layer are mainly designed. Mobile technology is applied to the module design to improve the performance of the college English vocabulary teaching system.

2.2.1. User Layer of the English Vocabulary Teaching System. The main users of the college English vocabulary teaching system are teachers and students. Through the interaction between them, the user layer is designed. The main functions of this layer are user login, system information setting, browsing English vocabulary resources, uploading English vocabulary homework, and other functions [11]. The module records the user's access behavior and forms log data for integration. In the user login data log integration, the user's repeated behavior data are integrated to help analyze the user's preferences [12]. Set the data collection accessed by the user as

$$X = \{x_1, x_2, \dots, x_n\}. \quad (1)$$

In the formula, x_1, x_2, \dots, x_n represents the user login log data, and n represents the number of log data.

Calculate the similar data in the user log data in formula (1) to obtain

$$\text{sim}X = \frac{u(x^2 + y^2)}{\sqrt{\sin(x^2 + y^2)}}. \quad (2)$$

TABLE 1: Mobile communication deployment mode selected in the college English vocabulary teaching system.

Project	Communication range	Key technology	Communication standards
Broadband wireless CLAN (WMAN)	Large-scale application	Multichannel multipoint allocation, local multipoint allocation, high-performance allocation	IEEE 802.16
Wireless LAN (WLAN)	Medium range	Wireless network, etc.	802.11
Personal local area network (WPAN)	Small range	Bluetooth, infrared light	EDR

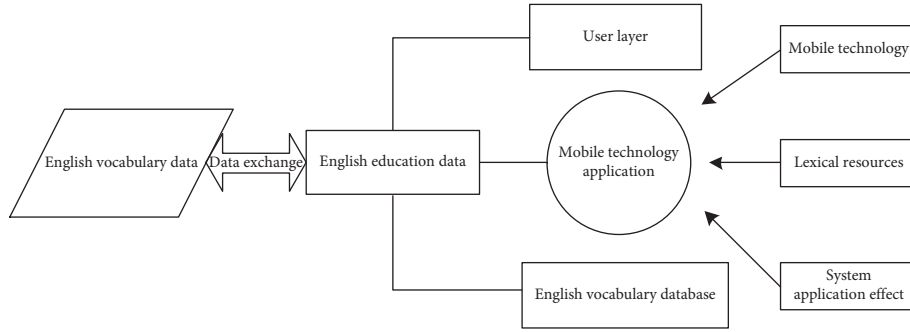


FIGURE 1: Basic framework of the college English vocabulary teaching system based on mobile technology.

In the formula, u represents the data similarity ratio, and \sin represents the data cosine similarity.

According to the determined similar data of the user login log, determine the main preferences of users logging in the system [13], which is the basis of system development. The basic operation flow of the user layer is shown in Figure 2.

The user layer design's main functions are user login, system information setting, English vocabulary resource browsing, uploading English vocabulary homework, and other functions, and the user preference data are determined through the user log.

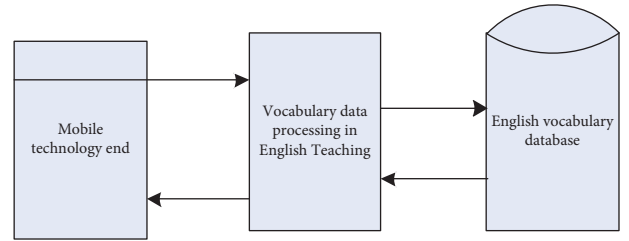


FIGURE 2: Basic operation flow of the user layer.

$$E = e_1 + e_2 + e_s + e_p + e_q. \quad (3)$$

In the formula, E represents the total end-to-end communication delay of the university English vocabulary teaching system and e_1 and e_2 represent the delay [17] for university English vocabulary data transfer processing, including the time required to package the output communication protocol and the data received by the user. e_s represents the delay of the output of the English vocabulary system. Since the node in the storage mechanism of the exchange device in the mobile network needs a certain transmission medium when receiving the English vocabulary data, the time delay of the system when exporting the English vocabulary operated by the user is

$$e_s = \frac{R}{w}. \quad (4)$$

In the formula, R represents the English lexical data frame, and w represents the network link bandwidth.

In this system, the protocol delay of communication processing is directly related to the mobile network performance of communication processing, and this value is relatively fixed. The Ethernet switch is used in the system designed in this paper, and its processing delay generally

2.2.2. Mobile Network Layer of the English Vocabulary Teaching System. The mobile network layer set in the college English vocabulary teaching system mainly relies on mobile technology. This layer's architecture facilitates the system's network connectivity and serves as the foundation for its regular operation [14]. As a result, owing to the huge scale and broad coverage of data in the college English teaching vocabulary system, the speed of real-time English vocabulary data exchange in the mobile network layer design in the system design [15] must be addressed in the network layer design of this study. As a result, the system's mobile communication latency is critical in the module's design. The network transmission delay in a WAN communication network is the time it takes for data to travel from the vocabulary starting node to the user receiving end point [16]. The transmission delay diagram of the mobile network layer is shown in Figure 3.

As can be seen from Figure 3, the calculation formula of time delay caused by the operation of the mobile network layer in the application of the college English vocabulary teaching system is as follows:

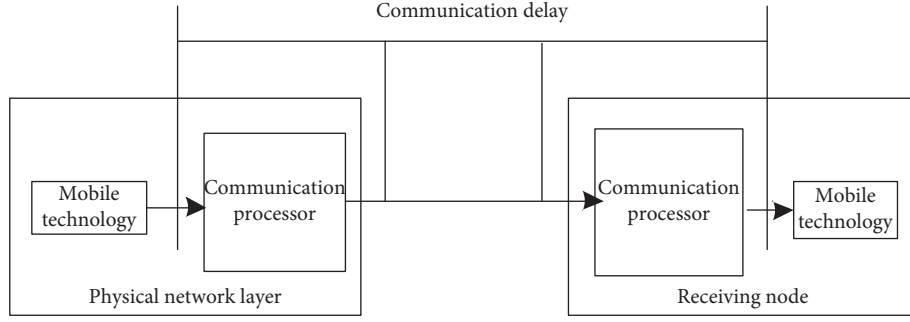


FIGURE 3: Transmission delay diagram of the mobile network layer.

does not exceed $10\mu s$ [18]. The MAC address table, VLAN, priority, and other functions processed by the switch chip of the mobile device are determined by the speed. The failure of the system in the college English vocabulary teaching system will also result in an increase in output delay [19]. As a result, system failure should be included in the time delay control in order to enhance the college English vocabulary teaching system's performance.

In the mobile network layer design of the English vocabulary teaching system, mobile technology is applied to design the system mobile communication delay control method, set the system mobile network layer LAN, and improve the system data transmission speed.

2.3. Design of the English Vocabulary Data Layer. According to the English network module set above, the English vocabulary data layer is designed, which contains all college English vocabulary data. In this module, the database's English vocabulary field [20] is basically set according to the English vocabulary data. The setting results are shown in Table 2.

Due to the enormous number and varieties of college English vocabulary curricular materials, it is required to extract the characteristics of English vocabulary data and effectively fuse the features of English vocabulary data in the design of the English vocabulary data layer [21]. We should examine the distance between English vocabulary data stored in the system while extracting features and use that distance to identify the link between the college English vocabulary [22]. The first multidimensional data of vocabulary data in the college English vocabulary teaching system contain a big number of English vocabulary data. In order to determine the distance between English vocabulary data, it is used as the credibility of feature extraction of English vocabulary data. This paper calculates the distance between English vocabulary data by calculating the Euclidean distance. In the English vocabulary system, the real distance between English vocabulary data in the n -dimensional space [23], the straight-line segment distance between vocabulary data in the system, is expressed as

$$g = \sqrt{(a_1 + b_1)^2 + (c_1 + d_1)^2}. \quad (5)$$

In the formula, a, b represent two adjacent university English vocabulary data, and c, d represents the two-

dimensional coordinate point in the English vocabulary teaching system.

The properties of English vocabulary data are derived by calculating the distance between college English vocabulary data. The normal distribution state between the two vocabulary data is assessed [24, 25] based on the calculated distance between English vocabulary data in order to fulfill the needs of system data storage. Suppose that, in the normal distribution diagram of English vocabulary data, one data point is A and the distance between the two data is $A1$. At this time, the normal distribution state between English vocabulary data is shown in Figure 4.

Under this distribution set, set the total of English vocabulary data m as the element, that is, all English vocabulary data distributed in the system. At this time, the mean vector of English vocabulary data is

$$q = \{q_1, q_2, \dots, q_n\}. \quad (6)$$

The covariance matrix calculation of the English lexical data in the system determined at this time is

$$\sigma = \sum (S_i)_{m \times n} \quad (7)$$

In the equation, the result of the covariance matrix calculation is σ .

According to the above analysis, the characteristics of the university English vocabulary data in the obtained system are

$$\xi(a, b) = (X - \sigma) \sum_{i=1}^n (a, b). \quad (8)$$

In the formula, $\xi(a, b)$ represents the vocabulary characteristics in university English vocabulary teaching, and X represents the scale factor.

According to the characteristics of the college English vocabulary obtained above, it is stored in the teaching system of this study. However, since there are so many comparable vocabulary data and certain words have a lot of noise, it is simple to impair the system's efficiency. As a result, the vocabulary elements of English education must be pre-processed in the system, comparable vocabulary data must be removed, and the system's reaction speed must be improved [26–28].

TABLE 2: Field settings of English vocabulary in the database.

Field	Vocabulary data type	Length	Remarks
COURSEID	Int(2)	2	Curriculum ID
COURSENAME	Varchar(50)	50	English vocabulary name
COURSECODE	Varchar(30)	50	English vocabulary teaching textbook
COURSETEXTBOOK	Varchar(80)	80	Descriptor
UINTID	Int(3)	3	English vocabulary unit ID
UINTname	Varchar(100)	100	English vocabulary unit name
UINTtitle	Varchar(100)	100	English vocabulary unit title

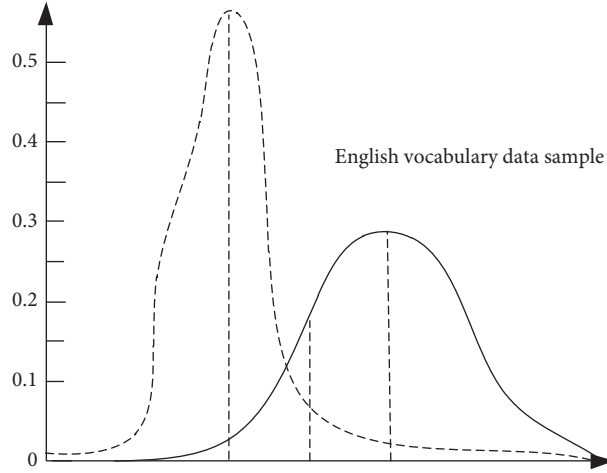


FIGURE 4: Normal distribution status between university English lexical data in the system.

The set of college English vocabulary features is set as A , which contains more typical English data. Firstly, the data in the set are effectively classified. In this paper, the features are classified with the help of the random forest algorithm, and the calculation formula is as follows:

$$F(x) = \frac{1/f(k)}{\sum_{i=1}^k (1/f(k))}. \quad (9)$$

In the formula, $f(k)$ represents the predicted distance between English vocabulary data at different times, and k represents the state value of the categorical English vocabulary data.

The above classified English vocabulary data were processed for data noise reduction in different data groups, and the results are

$$\tau(x) = \tau(x) \times F(x), x = 1, 2, \dots, m. \quad (10)$$

In the formula, $\tau(x)$ represents English vocabulary data after noise reduction, and $F(x)$ represents the noise interference coefficient.

Calculate the similarity of the above noise-free English vocabulary data, and delete the data with high similarity, so as to reduce the complex work of data processing in the system. The similarity calculation formula is

$$h_i(k) = yx + h_i(k)' \sum_{k=1}^n \tau(x). \quad (11)$$

In the formula, $h_i(k)'$ represents the observations of English lexical data, and y represents the similarity coefficient.

Based on the above calculated word similarity, the English vocabulary data with high similarity are removed to reduce the difficulty of system storage, obtaining

$$\theta_i(x) = l \sum_{i=1}^n u_i \frac{(x)}{k}. \quad (12)$$

In the formula, $u_i(k)$ represents typical English lexical data, and l represents key features in lexical data.

In the design of the system data layer, the English vocabulary field of the database is basically set according to the English vocabulary data, the Euclidean distance between words is calculated to determine the relationship between them, and the characteristics of college English vocabulary data are extracted by randomly classifying the vocabulary data types and calculating the similarity of the data, and the English vocabulary data with high similarity are removed to reduce the difficulty of system storage.

3. Experimental Analysis

3.1. Experimental Scheme Design. In order to verify the application effect of mobile technology in this paper, experimental analysis is carried out. In the experiment, the system is improved on the basis of the original system, and

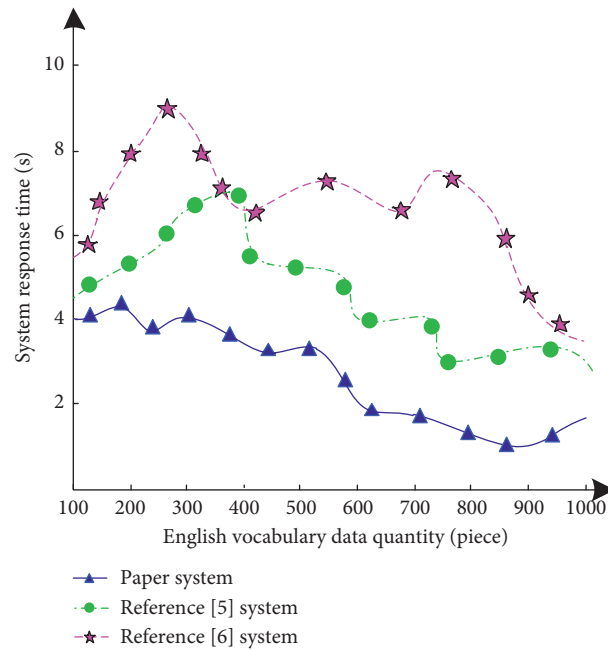


FIGURE 5: Comparison of response time-consuming results of different systems.

TABLE 3: Comparison of English vocabulary data transmission speed in different systems (s).

English vocabulary data/entry	This paper's system	Cui's [5] system	Liu and Huai-Long's [6] system
100	0.21	0.35	0.38
200	0.20	0.39	0.41
300	0.21	0.41	0.43
400	0.23	0.42	0.44
500	0.22	0.45	0.45
600	0.23	0.46	0.47
700	0.24	0.45	0.51
800	0.26	0.43	0.52
900	0.24	0.42	0.53
1000	0.23	0.43	0.54

the system is programmed with C language. The designed system can run normally. In the experiment, part of the vocabulary of CET-4 of the English network is input into the system database as the research data of this system. Taking the freshman class of English major in a university as the research object, this paper makes an experimental study based on the application effect of the students in this class.

3.2. Experimental Index Design. The experimental test compares this system, Cui's [5] system, and Talha's [29] system. In the experiment, the time consumption of the system response and the speed of English vocabulary data transmission are taken as experimental indicators to analyze the performance of the designed system.

3.3. Analysis of Experimental Results. In order to verify the effectiveness of this system, the time-consuming analysis of the system response in the application of this system, Talha et al.'s [30] system, and Liu and Huai-Long's [6] system is

analyzed in the experiment. Among them, with the change of the amount of vocabulary data, the shorter the response time, the faster the response speed of the system and the higher the performance of the system. The experimental results are shown in Figure 5.

By analyzing the experimental data in Figure 5, it can be seen that, with the change of the amount of English vocabulary data, there are some differences in the time consumption of the system response in the application of this system, Cui's [5] system, and Liu and Huai-Long's [6] system. When the quantity of data is 300, the reaction time of the system described in this study is around 4 s, Cui's [5] system is about 7 s, and [6, 27] system is about 9 s; although there are some changes in the general trend of the reaction times of the three systems, the response time of the system in this article always displays a decreasing trend, indicating that the response speed of the system in this paper is quick and practicable.

In order to further verify the effectiveness of the proposed system, the speed of transmitting English vocabulary

data in this system, Cui's [5] system, and Talha et al.'s [31] system is experimentally analyzed. The results are shown in Table 3.

By analyzing the experimental results in Table 3, it can be seen that there are some differences in the speed of transmitting English vocabulary data using this system, Cui's [5] system, and Liu and Huai-Long's [6] system. Among them, the transmission speed of this system changes with the continuous change of the amount of English vocabulary data, but it can be seen from the overall data that the transmission speed of this system is fast. This is because the system adopts mobile technology and sets the delay of network layer control data transmission, which improves the effectiveness of the system.

4. Conclusion

In order to improve the effect of college English vocabulary education, this paper designs a new teaching system with the help of mobile technology. Based on the original system, the functional module considers the response speed and transmission delay of the system in the network layer and completes the effective application of mobile technology. Through experiments, the effectiveness of the system designed in this paper is verified, which provides some help for English vocabulary teaching [32].

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

Acknowledgments

This work was supported by the Research on the Ecological Construction of Smart Foreign Language Classroom under the Background of 5g Era, 2021 Scientific Research Fund Project of Liaoning Provincial Department of Education (Project no. LJKR0193).

References

- [1] P. Seraj, B. Klimova, and H. Habil, "Use of mobile phones in teaching English in Bangladesh: a systematic review (2010–2020)," *Sustainability*, vol. 13, no. 12, pp. 145–155, 2021.
- [2] V. N. Hoi, "Understanding higher education learners' acceptance and use of mobile devices for language learning: a Rasch-based path modeling approach," *Computers & Education*, vol. 146, no. 1, pp. 103761–103772, 2019.
- [3] F. Liébana-Cabanillas, A. Japutra, S. Molinillo, N. Singh, and N. Sinha, "Assessment of mobile technology use in the emerging market: analyzing intention to use m-payment services in India," *Telecommunications Policy*, vol. 44, no. 9, pp. 102009–102018, 2020.
- [4] J. Hong, "Students' academic use of mobile technology and higher-order thinking skills: the role of active engagement," *Education Sciences*, vol. 10, no. 7, pp. 1–7, 2020.
- [5] D. Cui, "Design of intelligent computer proofreading system for English translation," *Modern Electronics Technique*, vol. 42, no. 4, pp. 179–182, 2019.
- [6] X. Liu and L. I. Huai-Long, "English vocabulary adaptive learning model based on machine learning algorithm," *Computer Systems & Applications*, vol. 30, no. 4, pp. 260–265, 2021.
- [7] Q. Yuan and J. Huang, "Research on semantic feature extraction and translation algorithm based on graph regular algorithm," *Electronic Measurement Technology*, vol. 43, no. 8, pp. 91–95, 2020.
- [8] M. C. Chiu and T. Chen, "Assessing mobile and Smart technology applications for active and healthy aging using a fuzzy collaborative intelligence approach," *Cognitive Computation*, vol. 25, no. 1, pp. 10033–10045, 2021.
- [9] X. Zhai and L. Shi, "Understanding how the perceived usefulness of mobile technology impacts physics learning achievement: a pedagogical perspective," *Journal of Science Education and Technology*, vol. 15, no. 2, pp. 1–10, 2020.
- [10] G. Gorghiu, C. Pribeanu, V. Lamanaukas, and V. Slekiene, "Usefulness of mobile teaching and learning as perceived by Romanian and Lithuanian science teachers," *Problems of Education in the 21st Century*, vol. 78, no. 5, pp. 719–733, 2020.
- [11] E. L. Tan and D. Y. Heh, "Mobile Teaching and Learning of Coupled-Line Structures: the multiple-1D coupled-line finite-difference time-domain method," *IEEE Antennas and Propagation Magazine*, vol. 62, no. 2, pp. 62–69, 2020.
- [12] L. Unsworth and K. A. Mills, "English language teaching of attitude and emotion in digital multimodal composition," *Journal of Second Language Writing*, vol. 47, no. 1, pp. 100712–100723, 2020.
- [13] P. Brian, "World englishes in English language Teaching-GlobalEnglishes for language teaching," *ELT Journal*, vol. 25, no. 3, pp. 36–49, 2020.
- [14] C. Wallis, "Using the eighteenth-century English phonology database (ECEP) as a teaching resource," *English Language and Linguistics*, vol. 24, no. 3, pp. 321–326, 2020.
- [15] Y. Qian, "Dynamism of collocation in L2 English writing: a bigram-based study," *IRAL - International Review of Applied Linguistics in Language Teaching*, vol. 11, no. 2, pp. 1–12, 2019.
- [16] M. Chen, J. Flowerdew, and L. Anthony, "Introducing in-service English language teachers to data-driven learning for academic writing," *System*, vol. 87, no. 2, pp. 102148–102159, 2019.
- [17] A. Stornaiuolo, E. E. Thomas, and G. Campano, "Critical digital and media literacies in challenging times: reimagining the role of English language arts," *Research in the Teaching of English*, vol. 54, no. 2, pp. 1452–1463, 2019.
- [18] J. Yang, "Understanding Chinese language teachers' beliefs about themselves and their students in an English context," *System*, vol. 80, no. 3, pp. 73–82, 2019.
- [19] G. Du, Z. Hasim, and F. P. Chew, "Contribution of English aural vocabulary size levels to L2 listening comprehension," *IRAL - International Review of Applied Linguistics in Language Teaching*, vol. 12, no. 4, pp. 1–10, 2021.
- [20] E. Cotos and Y.-R. Chung, "Functional language in curriculum genres: implications for testing international teaching assistants," *Journal of English for Academic Purposes*, vol. 41, no. 2, pp. 100766–100778, 2019.

- [21] A. Cheng, "The place of language in the theoretical tenets, textbooks, and classroom practices in the ESP genre-based approach to teaching writing," *English for Specific Purposes*, vol. 64, no. 3, pp. 26–36, 2021.
- [22] J. L. Coiduras, A. Blanch, and I. Barbero, "Initial teacher education in a dual-system: addressing the observation of teaching performance," *Studies In Educational Evaluation*, vol. 64, no. 6, pp. 100834–100846, 2020.
- [23] W.-C. Fang, H.-C. Yeh, B.-R. Luo, and N.-S. Chen, "Effects of mobile-supported task-based language teaching on EFL students' linguistic achievement and conversational interaction," *ReCALL*, vol. 33, no. 1, pp. 71–87, 2021.
- [24] S. W. L. Wong, V. W. H. Leung, J. K. Y. Tsui, J. Dealey, and A. Cheung, "Chinese ESL learners' perceptual errors of English connected speech: insights into listening comprehension," *System*, vol. 98, no. 1, pp. 102480–102493, 2021.
- [25] H. Y. Zhang, H. M. Huang, and W. Li, "Emotional change detection oriented speech emotion database," *Computer Simulation*, vol. 38, no. 9, pp. 448–455, 2021.
- [26] M. Talha, R. Tariq, M. Sohail, A. Tariq, A. Zia, and M. Zia: Review of International Geographical Education ISO 9000: (1987-2016) A Trend's Review, 2020.
- [27] M. Talha, "A history of development in brain chips in present and future," *International Journal of Psychosocial Rehabilitation*, vol. 24, no. 2, 2020.
- [28] Y. Zhao and M. Talha, "Evaluation of food safety problems based on the fuzzy comprehensive analysis method," *Food Science and Technology*, 2021.
- [29] M. Talha, "Financial statement analysis of atlas honda motors, indus motors and pak suzuki motors (evidence from Pakistan)," *Ilköğretim Online*, vol. 20, no. 4, 2021.
- [30] M. Talha, M. Sohail, and H. Hajji, "Analysis of research on amazon AWS cloud computing seller data security," *International Journal of Research in Engineering Innovation*, vol. 4, no. 3, pp. 131–136, 2020.
- [31] M. Talha, M. Sohail, R. Tariq, and M. T. Ahmad, "Impact of oil prices, energy consumption and economic growth on the inflation rate in Malaysia," *Cuadernos de Economía*, vol. 44, no. 124, pp. 26–32, 2021.