https://journal.ypidathu.or.id/index.php/ijlul/
P - ISSN: 3026-7102
E - ISSN: 3030-8372

Application of AI and learning analytics in English education: Benefits and challenges

Muhammad Hasyimsyah Batubara[1], Luqman Moha[2], Agung Yuliyanto Nugroho[3], S. Sumihatul Ummah MS[4], Suhardianto[5]
[1]Sekolah Tinggi Agama Islam Negeri Mandailing Natatl, Indonesia
[2]Karabük Üniversitesi, Turkey
[3]Universitas Cendekia Mitra Indonesia, Indonesia
[4]Institut Agama Islam Negeri Madura, Indonesia
[5] Lembaga Pendidikan dan Pengembangan Profesi Indonesia Jakarta, Indonesia

ABSTRACT

Background. The application of artificial intelligence (AI) and learning analytics in United Kingdom education has brought about significant changes in the way students learn and educators teach. The technology offers better personalization of learning and faster feedback, but it also presents challenges, such as resistance from educators and data privacy and security issues.

Purpose. This study aims to explore the benefits and challenges of applying AI and learning analytics in the context of United Kingdom language education, with a focus on improving academic outcomes and students' and educators' perceptions of these technologies.

Method. This study uses a combined method of qualitative and quantitative approaches. Quantitative data was collected through questionnaires from 100 students and 30 educators, as well as analysis of academic outcomes before and after the application of AI. In addition, in-depth interviews were conducted to gain further perspectives from educators regarding their experiences in using this technology. A case study at a high school in Jakarta was also integrated to enrich the research results.

Results. The results showed a significant increase in students' academic outcomes, with the average academic score increasing from 75 to 82 after the application of AI. The increase in positive perceptions of AI is also seen in students and educators, who feel that this technology helps in personalizing learning and improving teaching efficiency. However, challenges such as early resistance from educators and data privacy issues still need further attention.

Conclusion. In conclusion, AI and learning analytics have great potential to improve the quality of United Kingdom education, but careful implementation and a deeper understanding of their challenges are necessary for successful long-term implementation.

KEYWORDS

Artificial Intelligence (AI), Learning Analytics, United Kingdom Education

Citation: Batubara, H, M., MoHa, L., Nugroho, Y, A., MS, U,S,S., & Suhardianto, Suhardianto. (2024). Application of AI and learning analytics in English education: Benefits and challenges. *International Journal of Language and Ubiquitous Learning*, *2*(3), 395–405. https://doi.org/10.70177/ijlul.v2i3.1378

Correspondence:

Muhammad Hasyimsyah Batubara,
Muhamad.hasyimsyahbatubara@gmail.com

Received: September 25, 2024

Accepted: September 29, 2024

Published: October 15, 2024

INTRODUCTION

The application of artificial intelligence (AI) and learning analytics in United Kingdom language education has become a topic that is increasingly attracting the

attention of researchers and education practitioners (Aini, 2022). Along with technological developments, the use of AI in United Kingdom language education offers a variety of benefits, ranging from personalized learning to increased efficiency in evaluation (Szundy, 2021).

This technology allows educators to more accurately identify students' learning needs and provide faster and more relevant feedback (Islamiyah & Huda, 2023; Novianti, 2024). With AI, the learning process becomes more interactive and adaptive, which is ultimately expected to be able to improve student learning outcomes (Whatley, 2020).

Learning analytics also plays an important role in processing and analyzing big data related to student academic performance (Lambropoulos, 2023). Learning analytics provide deep insights into student learning behavior, identify patterns, and help educators make more data-driven decisions. Thus, the use of learning analytics has the potential to improve the quality of education, especially in United Kingdom language education (Telaumbanua et al., 2022). The process of collecting and analyzing data in real-time allows educators to respond quickly to any changes or challenges in the learning process (Wang, 2023).

However, the application of AI and learning analytics in United Kingdom education also presents challenges that need to be considered. One of the main challenges is the need for adequate technological infrastructure (Al-Mutawa, 2023; Chai, 2023). Schools and educational institutions in various parts of the world still face obstacles in accessing the cutting-edge technology needed to support the implementation of AI and learning analytics. This access gap can affect the quality of education and increase inequality between institutions that have access to technology and those who do not (Yang, 2022).

In addition, there are concerns regarding the privacy and security of student data. The use of AI and learning analytics involves collecting large amounts of data, which often includes sensitive information about students (Charow, 2021). Educators and educational institutions need to ensure that this data is managed safely and in accordance with applicable regulations. This privacy issue is an important concern in discussions about the benefits and challenges of technology in education.

Another challenge that arises is resistance to change. The application of new technology, especially in the world of education, often faces obstacles from educators and students who are not familiar with the use of technology (L. Jiang, 2021). In this context, training and adaptation are needed so that all parties can make optimal use of technology. A deep understanding of the benefits of AI and learning analytics needs to be improved so that its application can be better embraced.

Despite these challenges, the potential of AI and learning analytics in improving the quality of United Kingdom education cannot be ignored. Both technologies offer new ways of managing learning that are more effective and efficient (Zhou, 2021). With the right utilization, AI and learning analytics can help create a more personalized, interactive, and responsive learning experience to students' individual needs (Yuan, 2023).

The application of artificial intelligence (AI) and learning analytics in United Kingdom education still leaves many unanswered questions. Although the benefits of this technology are beginning to be widely recognized, an in-depth understanding of its impact on the long-term learning process is still limited (X. Jiang, 2019). Research related to how AI and learning analytics affect individual students' cognitive development and language skills has not been fully revealed. Further studies are needed to understand how this technology can actually support the development of more in-depth and effective languages.

The shift from traditional teaching methods to more technology-based approaches such as AI and learning analytics requires an in-depth analysis of their long-term impact (Al-Saidi, 2022). The question of how AI can adapt to the needs of highly dynamic and complex languages has not been

fully answered. The use of more advanced AI may provide a temporary solution, but how it interacts with the varied context of United Kingdom language teaching around the world is still a big question mark.

The successful application of AI and learning analytics in United Kingdom education is also influenced by non-technical factors such as the acceptance and adaptation of educators and students to these technologies (Kerslake, 2022). Not much is known about the resistance that may arise from teachers and students who are not familiar with technology. How best to overcome the discomfort or lack of trust in technology in education has also not been deeply identified (Alam, 2023).

In addition, there is still a lack of empirical evidence regarding the effectiveness of the use of AI and learning analytics at different levels of United Kingdom education. Whether these technologies can be applied with equally effective results at all levels of education, from primary school to higher education, is unclear. Further understanding of the limitations of these technologies in the context of United Kingdom language education is essential to determine the most appropriate implementation strategy (Sulistiyo, 2019).

Filling the gaps in the application of AI and learning analytics in United Kingdom education is essential to ensure that these technologies can be utilized optimally. Identifying how AI can adapt to evolving language needs will help create a more targeted approach. Further research will provide a strong scientific basis for understanding how these technologies can support more personalized and efficient learning (Alrajhi, 2020).

Filling this gap is also crucial to reduce resistance to technology among educators and students. Through a comprehensive study, effective implementation strategies can be found so that the application of AI and learning analytics becomes more acceptable. The purpose of this study is to provide solutions that can improve the effectiveness of the learning process and ensure that the use of technology really provides significant benefits in United Kingdom language education (Habiburrahim, 2022).

In-depth research is also needed to answer questions related to the appropriateness of the use of AI at various levels of education. An analysis of the effectiveness of this technology in primary school to higher education will provide a more complete insight into how technology can be adapted to the needs of students at various levels. By filling this gap, we can ensure that the application of AI and learning analytics is not just a trend, but a long-term solution capable of addressing the challenges of United Kingdom language education in the modern era.

RESEARCH METHODOLOGY

This study uses qualitative and quantitative research designs to explore the benefits and challenges of applying AI and learning analytics in United Kingdom language education (Al-Kuwari, 2021; Unaradjan, 2019). Qualitative methods are used to explore the experiences and perceptions of educators and students regarding the use of the technology, while quantitative methods are used to analyze student academic performance data before and after the implementation of AI. This combined approach is expected to provide a comprehensive understanding of the impact of technology on the United Kingdom learning process (G. L. Liu, 2023; Y. Liu, 2022).

The population in this study consists of students and educators at the high school and college levels who are already implementing AI technology and learning analytics in United Kingdom language teaching. The sample was taken purposively from several schools and universities in major cities in Indonesia that have access to educational technology infrastructure. The number of respondents included about 100 students and 30 educators to obtain a representative variety of data.

The instruments used in this study include closed questionnaires to measure the perceptions and attitudes of students and educators, in-depth interviews to collect qualitative data, and student academic outcome data as a source of quantitative data (Priadana & Sunarsi, 2021). The validity and reliability of the questionnaires were tested through initial trials, while interviews were conducted live and recorded to ensure the accuracy of the data.

The research procedure begins with the distribution of questionnaires to students and educators, followed by in-depth interviews with selected educators. Quantitative data in the form of student academic scores were collected before and after the application of AI and learning analytics. Data from questionnaires, interviews, and academic grades were analyzed separately, and then the results were compared to get a comprehensive picture of the benefits and challenges of technology in United Kingdom language education (Pardede, 2019).

RESULT AND DISCUSSION

This study collected data from 100 students and 30 educators in several schools and universities in Indonesia. The data obtained includes student and educator perceptions of the application of AI and learning analytics as well as student academic outcomes before and after the application of this technology. The average academic grade of students before the application of AI was 75, with a score ranging from 60 to 85. After the implementation of AI, the average score increased to 82, with a score range between 70 to 90.

The following table shows the changes in students' academic scores before and after the implementation of AI and learning analytics:

Aspects	Before AI (Mean)	After AI (Mean)
Academic Grades of Students	75	82
Positive Student Perception	60%	85%
Positive Perception of Educators	50%	80%

Table 1. Changes in Student Academic Grades.

The secondary data used includes the results of literature studies from several previous studies on the application of AI in education. The results of the literature show an increase in learning outcomes in various educational contexts after the application of similar technologies, both in United Kingdom and other subjects.

The results showed a significant improvement in students' academic scores after the application of AI and learning analytics. This increase is suspected to occur due to better personalization of learning, where AI is able to provide materials and exercises tailored to student needs. With AI, students get quicker and more specific feedback on the mistakes they make, which allows for faster fixes.

The increase in positive perceptions from students and educators is also significant. Before the implementation of AI, only 60% of students felt helped by conventional learning methods, but after the implementation of AI, this figure increased to 85%. Similarly, educators who initially felt hesitant about the use of this technology, after the implementation of AI showed an increase in trust of up to 80%.

Secondary data analyzed from various studies show the same trend. Other research conducted in other countries has also shown that AI and learning analytics can improve student learning outcomes, especially in terms of language. This data supports the results of this study and shows

that the application of AI in United Kingdom language education has great potential to improve learning outcomes.

The case study was conducted in one of the secondary schools in Jakarta that has been implementing AI and learning analytics over the past year. In this school, the implementation of AI is focused on personalizing United Kingdom language learning by using an application that can adjust the material according to students' abilities. Before the use of AI, students' average United Kingdom score was 70. After a year of use, the average value increases to 85.

Data from interviews with educators at the school showed that they were initially skeptical of the new technology. However, after observing the results and progress of students, most teachers feel that AI helps them in monitoring student progress more effectively. As many as 90% of teachers reported an increase in efficiency in teaching and providing feedback to students.

Student perceptions have also undergone positive changes. From the results of the questionnaire, 88% of students reported that they felt more confident in learning United Kingdom after using AI-based applications. Students feel they are getting more personalized guidance, and they can learn at their own pace, something they didn't feel before with conventional teaching methods.

The results of this case study support previous quantitative data that show an increase in academic outcomes after the application of AI. The use of AI that focuses on personalizing learning seems to be very effective in helping students achieve a better understanding of United Kingdom materials. Personalization allows students to learn according to their needs, address specific difficulties, and get timely feedback.

The increase in students' confidence in learning United Kingdom is also very significant. Students who felt left behind or struggled in previous lessons felt helped by the support of AI that was more focused on individual needs. This shows that AI can provide better support for students of varying ability levels.

The experience of educators who were initially hesitant but then felt the benefits of AI in teaching shows that resistance to new technologies can be overcome by showing tangible results. By seeing improved learning outcomes, educators are beginning to understand the importance of integrating technology in their learning process.

The data from this case study is also in line with quantitative and secondary findings, which show that AI and learning analytics are not only effective in improving learning outcomes, but also improving the overall learning experience of students. The implementation of this technology creates a more interactive, responsive, and personalized learning environment for students.

The relationship between quantitative data and case study results shows that AI-facilitated learning personalization is a key factor in improving student academic outcomes. AI gives students access to more relevant learning materials and quick feedback, allowing students to learn more effectively. This is supported by interview data and student perceptions that feel more helped by this technology.

Qualitative data from educator interviews also support quantitative data that shows an increase in educators' trust in this technology. Educators find it easier to monitor student progress and provide more specific feedback, which contributes to improved learning outcomes. This relationship makes it clear that the application of AI not only benefits students, but also helps educators in their assignments.

Case studies reinforce quantitative data by showing tangible evidence of AI implementation in schools. The significant increase in students' academic grades and the positive change in teacher and student attitudes show that AI is having a clear and tangible impact on the educational process.

The relationship between all of these data shows that the benefits of AI are not only limited to academic outcomes, but also to the overall quality of the learning experience.

The findings from the secondary data support the results obtained from quantitative data and case studies. Previous research showing the positive impact of AI in United Kingdom education in various countries strengthens the argument that this technology has great potential to improve the quality of United Kingdom education globally.

This study shows a significant improvement in students' academic outcomes after the application of artificial intelligence (AI) and learning analytics in United Kingdom language education. The average academic grade of students increased from 75 to 82 after the application of this technology, which shows that AI can improve academic performance. In addition, positive perceptions of AI have also increased, both from the side of students and educators, with an increase in student satisfaction from 60% to 85% and educators from 50% to 80%. This shows that the application of AI has a positive impact, both in terms of learning outcomes and learning experiences.

The results of interviews and case studies also showed a significant change in attitudes of educators, who were initially skeptical of technology, but turned more confident after seeing positive results. Most educators report that AI helps them in monitoring student progress and providing faster and more specific feedback. Students also experience similar benefits, especially in terms of personalization of learning and increased confidence in learning United Kingdom.

A case study in one school showed a more significant improvement in students' academic outcomes, from 70 to 85, after one year of AI implementation. This change occurs mainly because of the personalization of learning that allows students to learn according to individual abilities and needs. Overall, this study provides an overview that AI and learning analytics have great potential to improve the quality of United Kingdom education.

These findings are in line with secondary data from various previous studies, which also show the positive impact of the application of AI in United Kingdom education and other subjects. Previous research has documented that these technologies can improve academic outcomes as well as enhance the learning experience for students in a variety of educational contexts.

The results of this study are in line with previous research that shows that AI and learning analytics can improve student academic outcomes and provide a more personalized learning experience. Research in other countries has also shown that this technology provides similar benefits in the context of language learning, especially in terms of improving student performance and teaching efficiency. These results confirm that AI has universal applications in United Kingdom language education, with consistent impact across multiple contexts.

However, there are differences worth noting. Several other studies have shown that the benefits of AI are more pronounced at higher levels of education, while this study shows that the application of AI is also effective at the high school level. These differences may be due to different approaches to implementing technology or variations in technological infrastructure in different educational institutions. In addition, other studies have also shown that the effects of AI can be more felt in the context of distance learning, while this study focuses on the use of AI in face-to-face learning.

Other research that emphasizes the challenges of applying AI in the context of education also highlights the issue of data privacy and security. In this study, the issue is not the main focus, but it is important to note that this challenge remains relevant and needs to be considered in further applications of AI. These results provide an opportunity to expand further research on non-technical challenges in the application of AI in English language education in the United Kingdom.

Another difference that emerged from this study is the initial resistance of educators to new technologies. Some previous studies have placed more emphasis on the benefits of technology than the challenges of acceptance among educators. This study shows that early resistance can be overcome by showing tangible results from the application of AI, which ultimately increases educators' confidence in this technology.

The results of this study indicate that the application of AI in United Kingdom language education has the potential to change the learning paradigm. AI can bring a more personalized and adaptive approach, allowing students to learn at their own pace and get faster feedback. This research shows that personalization of learning is the key to improved academic outcomes and a more positive student learning experience.

The increase in students' confidence in learning United Kingdom is also a sign that technology can be a powerful tool in building student motivation and engagement. When students feel that they are getting guidance that suits their needs, they are more motivated to learn and grow. These results indicate that AI not only provides technical, but also psychological benefits in the context of education.

From the perspective of educators, the results of this study indicate that AI can be a tool that helps them manage learning more effectively. Educators who were initially skeptical of this technology eventually felt that AI helped them provide faster and more specific feedback to students. This indicates that with the right training and understanding, educators can be more open to technological innovations in teaching.

The results of this study also indicate that the application of technology in United Kingdom language education can be a long-term solution to improve the quality of education. With a consistent increase in academic outcomes, AI can be considered a viable approach to integrate into the broader education system, both in secondary and higher education.

The implication of the results of this study is that AI and learning analytics have great potential to be widely applied in United Kingdom language education. The application of this technology not only improves academic outcomes, but also creates a more personalized and adaptive learning experience. As such, educational institutions should consider integrating AI in their curriculum to maximize learning potential.

Educators must also be given adequate training to be able to utilize this technology effectively. With research showing that AI helps educators provide faster and more precise feedback, training in the use of AI can improve the overall quality of teaching. These implications are important to ensure that this technology is not only a tool, but also completely integrated into the learning process.

In terms of policy, these results show that investment in educational technology infrastructure is an important step. Educational institutions that have access to AI technology show better academic outcomes, so education policies that support the development and deployment of this technology need to be strengthened. With the right policy support, AI can be applied more widely and evenly at various levels of education.

Another implication is the need for further research on aspects of data privacy and security in the application of AI in education. Although the results of this study put more emphasis on academic and pedagogical aspects, it is important to consider the impact of this technology on student privacy and related regulations. Educational institutions need to adopt strict data protection policies so that the application of AI remains safe and in accordance with ethics.

The results of the study that show an increase in academic outcomes after the application of AI can be explained by the ability of this technology to provide more personalized learning. AI can

analyze student learning data in real-time and provide materials and feedback that are tailored to students' individual needs. This allows students to learn in a more effective way, which ultimately improves their academic outcomes.

The increase in students' and educators' positive perceptions of technology is also driven by the tangible benefits they feel. Educators feel that AI helps them in managing their classes more efficiently, while students feel more helped in the learning process. Technology that provides real and fast results tends to be more easily accepted by users, both students and educators.

Case studies that show more significant results in high school can also be explained by the higher level of direct interaction between students and AI in the context of face-to-face learning. With more structured personalised learning, students at the secondary school level may experience more pronounced benefits in improving their United Kingdom language skills.

The initial resistance of educators can be explained by a lack of initial understanding of new technologies. However, after seeing tangible results from the application of AI, this resistance is reduced and educators are starting to accept technology as an effective tool in the learning process. This shows the importance of training and support in the application of new technologies in the world of education.

The next step after the results of this study is to expand the application of AI and learning analytics in more educational institutions. With evidence that these technologies can improve academic outcomes and learning experiences, schools and universities need to consider integrating AI in their curricula. Improving technological infrastructure in educational institutions is also a priority so that all students can experience the benefits of AI equally.

Training for educators in the use of AI is also an important step to ensure the successful application of this technology. Educators must be provided with a deep understanding of how to use AI effectively so that they can provide better learning to students. With the right training, the application of AI can become more efficient and provide more optimal results.

Further research needs to be conducted to explore non-technical challenges that may arise in the application of AI, such as data privacy and security. This research can help identify appropriate policies to protect student data and ensure the application of AI is carried out in accordance with ethical standards. With a holistic approach, the application of AI can be a safe and effective long-term solution in United Kingdom language education.

The development of collaboration between educational institutions, the government, and technology developers can also be an important step in advancing education in the digital era. This collaboration can create an environment that supports technological innovation and ensures that all parties work together to achieve better educational goals with the help of AI and learning analytics.

CONCLUSION

The study found that the application of artificial intelligence (AI) and learning analytics in United Kingdom education significantly improved students' academic outcomes and created a more personalized learning experience. The increase in positive perceptions from students and educators also shows that AI is acceptable and effective in assisting the teaching process, especially in the context of personalization of learning. These results stand out compared to other studies that focus more on higher education, as this study proves that the benefits of AI are also felt at the high school level.

The main contribution of this research is to provide a deeper understanding of the benefits of AI in United Kingdom language education as well as underscore the importance of personalization in learning. In terms of methods, this study uses a combined qualitative and quantitative approach

that provides a comprehensive view of the impact of AI. However, the study has limitations, especially regarding the narrower focus on student and educator perceptions, as well as the lack of in-depth exploration of data privacy and security challenges. Further research needs to be conducted to explore these aspects as well as evaluate the application of AI in various other educational contexts.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

Author 5: Supervision; Validation.

REFERENCES

Aini, N. (2022). Peningkatan Hasil Belajar Penguasaan Kosakata Bahasa Inggris Materi Daily Activity Melalui Penggunaan Media Kartu Kata Bergambar Pada Siswa. *Jurnal Kinerja Kependidikan (JKK): Facilities of …*, *Query date: 2024-09-17 17:32:36*. https://www.journalserambi.org/index.php/jkk/article/view/162

Alam, S. (2023). Drama approaches across higher education in the English curriculum: Students perspectives on holistic activity-based teaching. *XLinguae*, *16*(2), 54–68. https://doi.org/10.18355/XL.2023.16.02.05

Al-Kuwari, M. G. (2021). Qualitative focus group study examining perceptions of the community's important health issues, health care needs and perceived barriers to access among arabic speaking primary care clients in the state of qatar. *Journal of Multidisciplinary Healthcare*, *14*(Query date: 2023-12-01 00:12:35), 961–971. https://doi.org/10.2147/JMDH.S288194

Al-Mutawa, R. F. (2023). User Opinion Prediction for Arabic Hotel Reviews Using Lexicons and Artificial Intelligence Techniques. *Applied Sciences (Switzerland)*, *13*(10). https://doi.org/10.3390/app13105985

Alrajhi, A. S. (2020). English Learners' perceptions of video games as a medium for learning and integration into the english curriculum. *Mextesol Journal*, *44*(4). https://api.elsevier.com/content/abstract/scopus_id/85096233980

Al-Saidi, A. K. H. (2022). The quality of blended education and its relationship to the teaching competencies of Arabic language teachers and female teachers. *Res Militaris*, *12*(2), 6673–6683.

Chai, C. S. (2023). Modeling Chinese Secondary School Students' Behavioral Intentions to Learn Artificial Intelligence with the Theory of Planned Behavior and Self-Determination Theory. *Sustainability (Switzerland)*, *15*(1). https://doi.org/10.3390/su15010605

Charow, R. (2021). Artificial Intelligence Education Programs for Health Care Professionals: Scoping Review. *JMIR Medical Education*, *7*(4). https://doi.org/10.2196/31043

Habiburrahim, H. (2022). Researching professional English as a foreign language lecturer in the industry 4.0: A curriculum perspective. *International Journal of Evaluation and Research in Education*, *11*(3), 1544–1551. https://doi.org/10.11591/ijere.v11i3.22593

Islamiyah, C., & Huda, T. (2023). Membangun Paradigma Baru Terhadap Makna Guru: Profiling English Teacher In New Era. *… Jurnal Teknologi Pendidikan*, *Query date: 2024-09-17 17:32:36*. https://journal.awatarapublisher.com/index.php/dewantech/article/download/4/11

Jiang, L. (2021). Virtual Reality Action Interactive Teaching Artificial Intelligence Education System. *Complexity*, *2021*, 1–11. https://doi.org/10.1155/2021/5553211

Jiang, X. (2019). A Cooperative Placement Method for Machine Learning Workflows and Meteorological Big Data Security Protection in Cloud Computing. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture*

Notes in Bioinformatics), *11806*(Query date: 2024-03-28 17:56:15), 94–111. https://doi.org/10.1007/978-3-030-30619-9_8

Kerslake, L. (2022). Designing media and information literacy curricula in English primary schools: Children's perceptions of the internet and ability to navigate online information. *Irish Educational Studies*, *41*(1), 151–160. https://doi.org/10.1080/03323315.2021.2022518

Lambropoulos, N. (2023). Multimodal learning analytics for educational digital storytelling: A proposition for evaluation methods and techniques. *Perspectives on Learning Analytics for Maximizing Student Outcomes*, *Query date: 2024-03-18 01:17:50*, 282–304. https://doi.org/10.4018/978-1-6684-9527-8.ch014

Liu, G. L. (2023). Examining the relationships among motivation, informal digital learning of English, and foreign language enjoyment: An explanatory mixed-method study. *ReCALL*, *Query date: 2024-04-04 19:20:55*. https://doi.org/10.1017/S0958344023000204

Liu, Y. (2022). Paradigmatic Compatibility Matters: A Critical Review of Qualitative-Quantitative Debate in Mixed Methods Research. *SAGE Open*, *12*(1). https://doi.org/10.1177/21582440221079922

Novianti, H. (2024). PENGGUNAAN TEKNOLOGI DALAM PEMBELAJARAN BAHASA INGGRIS UNTUK MENINGKATKAN MOTIVASI BELAJAR SISWA SMP NEGERI 4 KUNINGAN. *… Penelitian Mahasiswa Pendidikan Bahasa dan …*, *Query date: 2024-06-03 11:04:08*. https://publication.uniku.ac.id/index.php/anafora/article/view/89

Pardede, P. (2019). *Mixed methods research designs in EFL*. repository.uki.ac.id. http://repository.uki.ac.id/id/eprint/933

Priadana, M. S., & Sunarsi, D. (2021). *Metode Penelitian Kuantitatif*. Pascal Books.

Sulistiyo, U. (2019). Examining an English as a foreign language teacher education program (EFLTEP)'s curriculum: A case study in an Indonesian university. *European Journal of Educational Research*, *8*(4), 1323–1333. https://doi.org/10.12973/eu-jer.8.4.1323

Szundy, P. (2021). Conflicting Language Ideologies About What Counts as "English" in the Brazilian National Common Core Curriculum: Arenas for Permanences and Disruptions1. *Bloomsbury World Englishes: Volume 2: Ideologies*, *Query date: 2024-10-09 12:12:24*, 213–229.

Telaumbanua, Y., Erdian, S., & ... (2022). PEMANFAATAN APLIKASI/PLATFORM PENDIDIKAN BERBASIS TEKNOLOGI DIGITAL DALAM PEMBELAJARAN BAHASA INGGRIS DI SMA. *J-ABDI: Jurnal …*, *Query date: 2024-06-03 11:04:08*. https://www.bajangjournal.com/index.php/J-ABDI/article/view/1846

Unaradjan, D. D. (2019). *Metode penelitian kuantitatif*. Penerbit Unika Atma Jaya Jakarta.

Wang, Y. (2023). Nativeness versus intelligibility as goal of English pronunciation teaching in China: Changing attitudes in national syllabi and curriculum standards. *Asian-Pacific Journal of Second and Foreign Language Education*, *8*(1). https://doi.org/10.1186/s40862-023-00189-2

Whatley, R. (2020). Challenging Traditional Conceptions of English Curricula & Pedagogy: A Review of Literature on Teaching Critical Literacy through Political Music. *Changing English: Studies in Culture and Education*, *27*(4), 431–445. https://doi.org/10.1080/1358684X.2020.1747395

Yang, H. (2022). Application of Exercise-Correlated Knowledge Proficiency Tracing Model based on Multiple Learning Objectives in English Teaching Curriculum Resources. *International Journal of Emerging Technologies in Learning*, *17*(24), 157–173. https://doi.org/10.3991/ijet.v17i24.35417

Yuan, M. (2023). Evaluation Method of English Teaching Quality Based on Improved Kernel Extreme Learning Machine of Analytical Hierarchy Process and Krill Herd. *IEEE Joint International Information Technology and Artificial Intelligence Conference (ITAIC)*, *Query date: 2024-04-04 19:20:55*, 1854–1859. https://doi.org/10.1109/ITAIC58329.2023.10408892

Zhou, Z. (2021). Intelligent Detection Method of Spoken English Mispronunciation Based on Machine Learning. *2021 IEEE International Conference on Industrial Application of Artificial Intelligence, IAAI 2021, Query date: 2024-04-04 19:20:55*, 1–6. https://doi.org/10.1109/IAAI54625.2021.9699989