An Investigation of the Broad Impact of Artificial Intelligence Learning Tools in Advancing Students' Success in Higher Educational Institutions

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ABSTRACT

The innovation of Artificial Intelligence (AI) has caused a dramatic change in different sectors, including education and language learning. This paper aims to explore the Foundation Programme Department (FPD) teachers' views on AI-learning tools. It additionally investigates the impact of these tools on students' classroom engagement and academic achievement in the context of the higher educational institutions (HEIs). This study is conducted on a small population of FPD teachers and follows a mixed method approach. Quantitative data came from questionnaires to 15 teachers and academic records, while qualitative data was gathered through interviews with 3 teachers. The results show that a small proportion of the FPD teachers are satisfied with the AI educational technologies. Moreover, it was noticed that the employment of AI educational tools, including personalised learning, instant feedback and interactive learning practices, has a positive influence on the students' academic performance, as noticed by higher grades in their English modules and advancement in their language proficiency.

KEYWORDS

Academic Achievement, Artificial Intelligence, Foundation Programme Department, Higher Educational Institutions.

1. INTRODUCTION

Higher Educational Institutions (HEIs) globally view the emergence of AI with interest and also uncertainty. There are challenges at the decision-making level around plagiarism, the undermining of critical and creative thinking skills, and user resistance, the latter on the part of teaching staff. However, the positive significance of this digital technology is real providing enhanced teaching and learning opportunities for education providers and their students [4]. This study is an in-depth investigation that draws on insights from current reliable sources to highlight the multifaceted impact of AI technologies in reshaping the education system nationally. This is in keeping with Oman Vision 2040, the national reference for social and economic planning for the period 2021 – 2040, that includes a focus on raising the quality of schools and higher education, developing curricular and educational programs, creating a national system that identifies and supports talented and creative pioneers, and develops scientific research and innovation. AI-enhanced learning is fully aligned with this vision. (Al Mawali, 2024). The aim of this study is to explore the effect of AI learning tools on foundation students in terms of classroom engagement and academic performance, specifically relating to IELTS preparation course, and English for Specific Purposes (ESP) courses for Engineering. This paper will investigate on the teachers' standpoints towards the application of Artificial Intelligence and the impact of this innovation on the students' academic excellence. It will highlight the following questions: 1) Do you use AI tools such as ChatGPT to create learning materials for your students?

2) Would you like further training on the use of AI such as ChatGPT? 3) Do you think that learning materials created using AI tools such as ChatGPT are more engaging for your students? 4) Do you think that learning materials created using AI tools such as ChatGPT lead to your students performing better in assessment? This study encourages academics and researchers to explore how AI can be integrated effectively to develop the education system and investigate potential obstacles of its application in this field.

2. LITERATURE REVIEW

2.1. Historical Perspective Of Artificial Intelligence

The notion 'Artificial Intelligence' indicates the behaviour of machines whereby if human beings behave correspondingly, they are considered intelligent. It is the science of creating machines that can think. It is a challenge to find alternate definitions due to the lack of identifying factors describing human intelligence and cognition. In an older definition, it is described as the study in which computers produce things that might be done better by humans [5]. Also, it is defined as the science and engineering of creating intelligent computer software programs and machines [14]. In fact, the first application of AI was created by McCarthy in 1956 [19]. AI applications are a collection of developed systems, voice identification, comprehension of real language and rule-based categorisation [14]. These applications assist humans in education and healthcare and find reliable and valued data on the internet [10].

2.2. The Role Of Artificial Intelligence In Education

The impact of AI has been noticed significantly in different sectors, like education and language learning. It also has a massive role in the education sector in which teacher/instructor understands the student need faster. Additionally, the student may learn based on their needs without facing any challenges [7]. Some solid arguments believe that teachers cannot be substituted by AI application. It is not surprising that AI tools will help teachers to make the teaching and learning methods more sufficient and empirical. Thus, they may take the benefit of AI in education, especially in completion of admin works such as attendance, lesson plan, and setting up learning outcomes.

2.3. Artificial Intelligence Application In Language Learning

The employment of AI tools technologies in language learning settings creates a range of possibilities in advancing language learning skills such speaking, listening, reading and writing. AI-driven tools, i.e. speech recognition systems, chatbots, virtual tutors, and language learning tools have integrated as interactive and immersive language learning practices. These applications offer aspects such as immediate feedback, tailored evaluation, and customised material, which have the potential to support students' speaking skills and enhance their language acquisition [18]. Students in traditional classrooms may not receive enough feedback for their writing assignments due to overload of work that teacher may have. As well as, without marking the writing tasks teachers may not be able to observe students' progressions [23]. Subsequentially, the application of digital writing feedback may reduce the workload of the teachers and find sufficient time to evaluate the students' writing. What is more, AI can enhance and support language learning for fostering digital writing. Digital writing is an umbrella of teaching practices, like feedback, networking websites, digital content creation and other methods of digital communication [23]. A study conducted by [15]. has investigated to what extent that online writing developed writing proficiency of English for Foreign Language students in Canada. However, the

results showed that enhancement of digital writing applications is not enough to create a big difference. Their quality writing can be developed through face-to face classroom feedback.

2.4. Impact Of Artificial Intelligence On Classroom Engagement And Academic Achievement

Engagement was initially defined as 'the amount of physical and psychological energy that the student devotes to academic experience' [2]. However, the engagement was later introduced as the power and time that students spent to advance their academic achievement [9], which involved contribution to learning experience and classroom interaction with pairs and teachers, and curriculum assignments [17]. The integration of AI learning tools into classroom environment has brought into our knowledge the potential influence on the learning and teaching process. There are multifaceted studies, and research has demonstrated the importance of AI advanced technologies in shaping the education system, facilitating the learning process, and personalised curriculum. In China, mobile learning technologies are widely used in education, i.e. Rain classroom, and WeChat. These mobile learning devices have been tested comparatively in terms of classroom engagement and learning outcomes [23]. Rain classroom is improved to develop learning process whereas WeChat is developed to improve students' communication skill. As a result, it has been witnessed that student engagement and learning outcomes assisted with rain classroom are significantly higher than those developed with WeChat. On the other hand, student engagement and learning outcomes assisted with WeChat have been developed dramatically than those developed by other traditional mobile systems [22]. A further study was conducted in Indonesia universities to a random group of students demonstrated that AI has a positive influence in leveraging up students' classroom engagement and academic performance. Students using AI tools have shown a high-level of engagement compared to groups following traditional education methods. The researchers have perceived that these experimental students have achieved a high-level of advancement in their academic performance [15].

2.5. Artificial Intelligence Improving Academic Outcomes

The impact of AI-driven tools includes several key points, like personalised learning, and real-time feedback and assessment. Personalised learning has some resemblance to other existing AI learning tools. This type of technology allows learners or students to get personal assistant service. This technology is quite widely used by Khan Academy (https://www.khanacademy.org/), Duolingo (https://www.duolingo.com/), Ruangguru (https://www.ruangguru. com/) …etc. It additionally allows students to advance and improve based on speed and ability of learning style on the basis of their needs and capability [16]. AI is also used for online automatic assessment. This technology helps teachers and tutors to prepare and create online quizzes smoothly and effectively, so they don't need to create quizzes manually. One application of automatic assessment is creation of quizzes and automatic corrections conducted by the Kejarcita platform (https://kejarcita.id/). Teachers only need to adopt these quizzes according to the topic area, students' level number of questions, and complexity level [3]. This technology has been incorporated in HEIs over the past four years after the Covid-19 pandemic where the teachers and tutors had created and prepared quizzes online. This technology helped teachers evaluate and assess students remotely, reducing the workload associated with repetitive administrative tasks such as preparing lesson plans, grading exams, and reviewing student assignments.

2.5. Evidence And Case Studies In Higher Educational Institutions

AI application technologies are widely used in HEIs as an assistant teaching tool and enhances language

learning in classroom setting some of which is Chat GPT. It is introduced as an artificial intelligence generated content (AIGC) model improved by OpenAI [21]. A semi-structure interview was conducted to collect teachers and practitioners' feedback on employment of AI learning tools. Chat GPT is used to generate online quizzes such as Kahoot and Quizlet. It additionally helps the teacher to brainstorm and set up English lessons, like vocabulary and grammar lessons. One teacher reported that he usually utilises it when there are no adequate classroom activities to keep the students engaged, so using ChatGPT assists the instructor in engaging students and enhancing their language learning [22]. This teacher perceived that AI cannot replace human beings and a good teacher can adopt very interactive and productive lessons. Another teacher uses Chat GPT to produce interactive conversational practice and post-discussion. It also generates responses to the same discussion questions covered with students. It helps to build vocabulary and retention. Incidentally, this would occur after having Chat GPT generated responses to the discussion questions [13]. This learning digital tool helps to set up and generate online questions [23]. He believes that Chat GPT makes students reluctant and procrastinate to think critically. Chat GPT can enhance and support writing skills where it helps teachers to produce jigsaw and standard conversation practice. The integration of this AI-driven tool in research provides students with relevant vocabulary to build up their research skills. He also perceives that AI learning technologies can substitute the teacher in future due to rapid change in technology [23].

2.6. Challenges Of Adopting Ai In Higher Educational Institutions

Over the past-three decades, AI-driven tools have been widely employed by practitioners and researchers in language education [27]. However, they faced challenges of employment of AI for language learning one of which is students with different academic level may not meet the same learning outcomes. The authors of this current study conducted a semi-structured interview with three teachers using AI learning technologies in their classroom. As one of those teachers mentioned that he faced internet connection issues due to being shared by a vast number of users [23]. He also found out that AI has errors in output in which it produced inaccurate and irrelevant items such as misinterpretation of context. Another challenge occurred of using AI in classroom raised by [13] is the reliability or instability of the HEIs internet infrastructure means there are daily disruptions in connectivity. This limits the efficiency with which students and the teacher can connect to a website, connect to Chat GPT. Although I feel proficient in my ability to produce a sensible prompt I calculate how, when & why AI will complement my lesson aims. Moreover, using AI tools Without actual training programs, teachers cannot make the most out of AI. The output of AI is deliberately generic. It takes training in things like Prompt Engineering to get it to be creative and engaging. Additionally, the unreliable Wi-Fi is prohibitive to the use of AI websites in HEIs. When we cannot rely on the possibility for 20 students to connect simultaneously, teachers are discouraged from attempting to make use of online tools for classroom or homework tasks [23].

3. RESEARCH METHODOLOGY

This paper aims to explore the Foundation Programme Department (FPD) teachers' satisfaction with AI-learning tools. It additionally investigates the impact of these tools on students' classroom engagement and academic performance in the context of the Higher Educational Institutions (HEIs). This study was conducted on FPD teachers in HEIs. It was also conducted at the end of this academic year 2024. An online questionnaire was produced and shared with the FPD teachers. There were 10 participants participating in this survey. Moreover, a semi-structured interview was conducted to collect teachers' insights of the AI-driven tools in advancing students' success. The collected data will be shown in graphs and charts in the following sections.

3.1. Results And Discussions

70% of the overall number of participants answered this questionnaire of the teachers' satisfaction on application of AI learning tools in teaching practices. However, the paper will highlight these participants only.

3.2. Research Question 1

Do you use AI tools such as ChatGPT to create learning materials for your students?

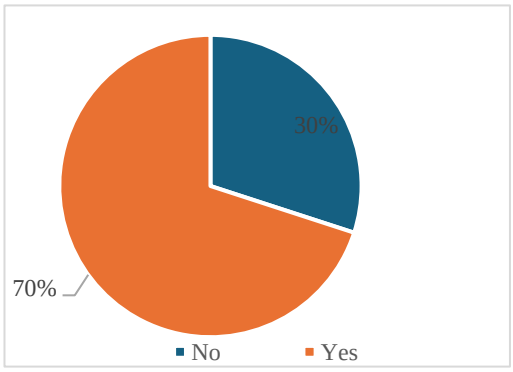

Figure 1. Use of ChatGPT in creating learning materials

The first research question surveyed the teachers if they use artificial intelligence to create learning materials for their students in English classrooms. The chart above showcases that 70 % of teachers who used ChatGPT confirmed that it had a positive impact on teaching practices, in which it assisted teachers to produce activities aligned with their lesson aims. This study aligns with the benefit of AI-powered education that enables personalised, flexible, and engaging learning by offering tools that adapt to both content and student emotions. It helps develop sought-after skills, creates advanced learning environments, and supports collaborative learning by forming optimal groups and providing timely assistance [11]. On the other hand, 30% of teachers didn't use ChatGPT as an assistant tool to create learning materials. This implies that teachers have a strong belief that ChatGPT does not play a major role in classroom engagement.

3.3. Research Question 2

Would you like further training on the use of AI such as ChatGPT?

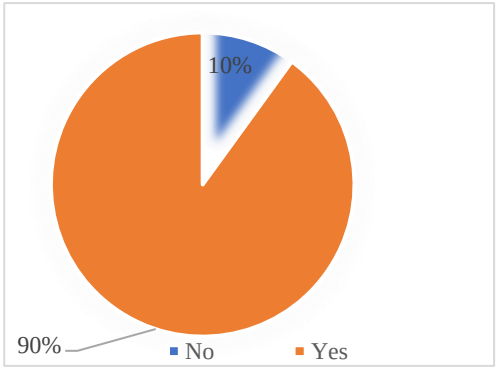

Figure 2 . Interest in further training on the use of ChatGPT

The results of the second question show whether teachers need to have further training on the use of ChatGPT. Techers perceived that having more training on the application of AI tools would be very helpful in creating classroom activities and delivering the lesson plan designed.

Interestingly, 90% of participants confirmed that they would have greater training to prepare teachers for the application of AI-driven tools in foreign language classrooms. This suggestion is aligned with a claim “to equip current and future language teachers with the knowledge and skills, both technical and pedagogical, to incorporate technology effectively into their classes” [8]. On the contrary, 10% of participants find they don’t need more training on the application of AI-driven technologies.

3.4. Research Question 3

Do you think that learning materials created using AI tools such as ChatGPT are more engaging for your students?

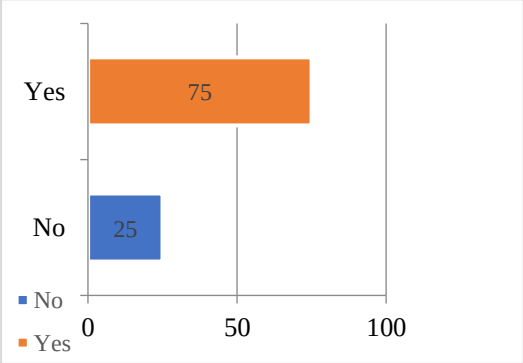

Figure 3. Reception on whether AI-driven tools are more engaging for students

The results of the third question present that ChatGPT plays a vital role in classroom engagement in which it enhances students and supports students in an interactive classroom setting. 75% of participants agreed with the claim that learning materials using AI tools such as ChatGPT are more engaging for their students. Some of teachers observed the positive impact of ChatGPT in the classroom activities confirming that gamification material is especially easy to create with ChatGPT, and students seem to really enjoy it. Others believe that students have a solid background on how to use AI tools, thus it facilitates the application of ChatGPT in the classroom. This suggestion matches with a large extent of the study that emerging ChatGPT into educational environment, teachers can level up its features to produce interactive learning practices for students [1].

On the other hand, 25% disagreed with the statement that learning materials improved with AI tools like ChatGPT are more engaging for their students. One of instructors have proven his disagreement saying that AI tools cannot be more engaging for his students, and he perceived that incorporating AI technology to be paralleled to the traditional education. Another perspective received from HEIs teachers illustrated that the unreliable Wi-Fi in HEIs significantly hinders the use of AI websites. When it is uncertain whether 20 students can connect at the same time, teachers are dissuaded from incorporating online tools into their classroom activities or homework assignments [22]. Others believe that the use of AI doesn't automatically mean the materials are more engaging. It just means

the teacher can create more, faster. Engaging materials are materials that challenge the students to think differently. AI is vanilla when it comes to making materials.

3.5. Research Question 4

Do you think that learning materials created using AI tools such as ChatGPT lead to your students performing better in assessment?

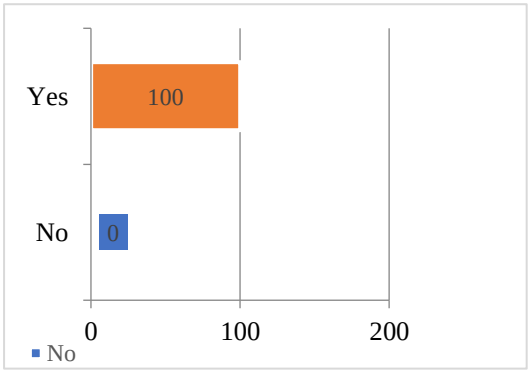

Figure 4. Reception on whether AI-Generated learning materials improve student assessment performance

The fourth research question explored whether teachers believe that AI tools like ChatGPT can enhance student performance in assessments. The chart indicates that 100% of teachers agree that using AI tools leads to better assessment outcomes for students, reducing their own workload and accelerating student progress. This finding supports the advantages of AI, such as time savings and increased efficiency in task completion. AI can automate routine tasks like assignment grading and assist with administrative duties, including scheduling, resource allocation, and classroom management. Conversely, none of the teachers think that AI tools will fail to improve student performance in assessments [12].

4. CONCLUSION

This paper attempted to investigate the FPD teachers' perception toward the application of AI-driven tools in classroom environments. It also aimed to explore the impact of AI in advancing students' academic performance in the context of the Higher Educational Institutions. Through the integration of AI tools in improving academic outputs, such as personalised learning, real-time feedback and assessment, AI has enhanced educational experience. These AI applications provide moulded support in vocabulary building, conversational practices, reading comprehension, and writing correction considering that every student receives targeted support according to his need. The results of this study revealed that AI tools play a major impact on shaping the classroom setting and contributed to providing adequate support for both teaching and learning practices. Moreover, the majority of participants who took part in this study were satisfied with the AI application in educational practices. However, there were very few who showed dissatisfaction with the integration of AI as they prefer to follow traditional teaching approaches than relying on AI technologies. This study emphasises the importance of AI applications in not only developing students' language learning but also promoting their deeper understanding of cultural context and empirical application. Consequently, the students at HEIs are better prepared for their future challenges and academic interests. Ultimately, the wide use of AI tools

has evidenced to be a transformative force in the Higher Educational Institutions education, promoting a higher performance and preparing students to face their future challenges with self-confidence and high levels of competence.

5. LIMITATIONS

While this investigation provides impressive feedback into the influence of AI applications on the students' achievements at HEIs, more diverse limitations need to be recognised in this manner. The sample size is a primary limitation in this study and there is no mechanism presented for how to evaluate the role AI has on student performance quantitatively. This study is exclusive to the small number of teachers which may not be representative of the entire teachers' population in FPD at the Higher Educational Institutions. This limits the generalizability of the results to a broader context. Another limitation is measurement and data collection. The reliance on self-reported data from instructors is another notable limitation. Self-reports can introduce bias, as participants may overestimate or underestimate the impact of AI tools due to personal perceptions. Short-time duration is another limitation that should be acknowledged. The researchers had a short time to submit the paper that may affect the quality of paper. However, there are some implications that future studies might consider, including larger and more diverse samples to enhance the generalizability of the findings. Additionally, including a more diverse range of participants from various departments and backgrounds within the college can provide a more comprehensive understanding of the impact of AI tools. Extension of deadline submission may help the researchers to explore in depth the impact of AI tools on students' academic achievement and broaden this study to a more divers context in the education field.

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REFERENCES

[1] R. M. AlAli and A. A. Al-Barakat, "Leveraging the revolutionary potential of ChatGPT to enhance kindergarten teachers' educational performance: A proposed perception," *Eurasian Journal of Educational Research*, vol. 106, no. 106, pp. 50–69, 2023.

[2] A. W. Astin, "Student involvement: A developmental theory for higher education," *Journal of College Student Development*, vol. 40, no. 5, pp. 518–529, 1984. [Online]. Available: https://doi.org/10.1002/1097-4679(198411)40:63.0.C

[3] Y. Bin and D. Mandal, "English teaching practice based on artificial intelligence technology," *Journal of Intelligent & Fuzzy Systems*, vol. 37, no. 3, pp. 3381–3391, 2019. [Online]. Available: https://doi.org/10.3233/JIFS-179141

[4] J. Crawford, M. Cowling, and K.-A. Allen, "Leadership is needed for ethical ChatGPT: Character, assessment, and learning using artificial intelligence (AI)," *Journal of University Teaching & Learning Practice*, vol. 20, no. 3, 2023. [Online]. Available: https://doi.org/10.53761/1.20.3.02

[5] E. Rich, *Artificial Intelligence*. New York: McGraw-Hill, 1983.

[6] A. Essien, O. T. Bukoye, X. O'Dea, and M. Kremantzis, "The influence of AI text generators on critical thinking skills in UK business schools," *Studies in Higher Education*, vol. 0, no. 0, pp. 1–18, 2024. [Online]. Available: https://doi.org/10.1080/03075079.2024.2316881

[7] T. N. Fitria, "QuillBot as an online tool: Students' alternative in paraphrasing and rewriting of English writing," *Englisia: Journal of Language, Education, and Humanities*, vol. 9, no. 1, pp. 183–196, 2021. [Online]. Available: https://doi.org/10.22373/ej.v9i1.10233

[8] P. Hubbard, "CALL and the future of language teacher education," *CALICO Journal*, vol. 25, no. 2, pp. 175–188, 2008.

[9] G. D. Kuh, "What student affairs professionals need to know about student engagement," *Journal of College Student Development*, vol. 50, no. 6, pp. 683–704, 2009. [Online]. Available: https://doi.org/10.1353/csd.0.0099

[10] D. Li and Y. Du, *Artificial Intelligence with Uncertainty*. Boca Raton, FL: CRC Press, 2017.

[11] R. Luckin, W. Holmes, M. Griffiths, and L. B. Forcier, *Intelligence Unleashed: An Argument for AI in Education*. London: Pearson, 2016.

[12] S. Lynam and M. Cachia, "Students' perceptions of the role of assessments at higher education," *Assessment & Evaluation in Higher Education*, vol. 43, no. 2, pp. 223–234, 2018. [Online]. Available: https://doi.org/10.1080/02602938.2017.1329928

[13] Ph. Maria, personal communication, June 16, 2024.

[14] J. McCarthy, "What is artificial intelligence," 2007. [Online]. Available: http://jmc.stanford.edu/articles/whatisai/whatisai.pdf

[15] K. A. Moore, C. Rutherford, and K. A. Crawford, "Supporting postsecondary English language learners' writing proficiency using technological tools," *Journal of International Students*, vol. 6, no. 4, pp. 857–872, 2016. [Online]. Available: https://doi.org/10.32674/jis.v6i4.321

[16] K. Mirdad, O. P. M. Daeli, N. Septiani, A. Ekawati, and U. Rusilowati, "Optimizing student engagement and performance using AI-enabled educational tools," *CORISINTA*, vol. 1, no. 1, pp. 53–60, 2024.

[17] M. Mufdalifah, "Personalized learning dan multimedia berbasis komputer: Masih perlukah guru?" *JINOTEP (Jurnal Inovasi Dan Teknologi Pembelajaran): Kajian Dan Riset Dalam Teknologi Pembelajaran*, vol. 1, no. 1, pp. 50–57, 2017.

[18] E. T. Pascarella and P. T. Terenzini, *How College Affects Students: A Third Decade of Research*. San Francisco, CA: Jossey-Bass, 2005.

[19] R. Rusmiyanto, N. Huriati, N. Fitriani, N. K. Tyas, A. Rofi'i, and M. N. Sari, "The role of artificial intelligence (AI) in developing English language learners' communication skills," *Journal on Education*, vol. 6, no. 1, pp. 750–757, 2023.

[20] S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2010.

[21] *Scaling Mentoring Support with Distributed Artificial Intelligence*, *Intelligent Tutoring Systems*, pp. 38–44, 2020.

[22] B. Sheehan, personal communication, June 15, 2024.

[23] Z. Stalnaker, personal communication, June 16, 2023.

[24] T. Wu, S. He, J. Liu, S. Sun, K. Liu, Q. L. Han, and Y. Tang, "A brief overview of ChatGPT: The history, status quo and potential future development," *IEEE/CAA Journal of Automatica Sinica*, vol. 10, no. 5, pp. 1122–1136, 2023.

[25] Z. Yu, L. Yu, Q. Xu, W. Xu, and P. Wu, "Effects of mobile learning technologies and social media tools on student engagement and learning outcomes of English learning," *Technology, Pedagogy and Education*, vol. 31, no. 3, pp. 381–398, 2022.

[26] S. Yu, N. Zhou, Y. Zheng, L. Zhang, H. Cao, and X. Li, "Evaluating student motivation and engagement in the Chinese EFL writing context," *Studies in Educational Evaluation*, vol. 62, pp. 129–141, 2019.

[27] D. Zou, S. Luo, H. Xie, and G. J. Hwang, "A systematic review of research on flipped language classrooms: Theoretical foundations, learning activities, tools and research topics and findings," *Computer Assisted Language Learning*, 2020. [Online]. Available: https://doi.org/10.1080/09588221.2020.1839502