THE USE OF ARTIFICIAL INTELLIGENCE IN PRIMARY SCHOOL: TEACHERS' PERCEPTIONS

L'USO DELL'INTELLIGENZA ARTIFICIALE NELLA SCUOLA PRIMARIA: LE PERCEZIONI DEGLI INSEGNANTI

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ABSTRACT
The aim of research was to examine the impact of teachers' perceptions on the continued usage intention of AI technology in primary schools. The research data were analyzed using descriptive and inferential analysis. The findings of the study divulged that teachers' perceptions exerted an influence on their intention to persist in using AI technology. Therefore, policymakers must critically consider the responses of teachers to transform working conditions and academic curricula.

Lo scopo della ricerca è stato esaminare l'impatto delle percezioni degli insegnanti sull'intenzione di continuare a utilizzare l'intelligenza artificiale nelle scuole primarie. I dati della ricerca sono stati analizzati mediante analisi descrittiva e inferenziale. I risultati dello studio hanno rivelato che le percezioni degli insegnanti hanno esercitato un'influenza sulla loro intenzione di persistere nell'uso della tecnologia IA. Pertanto, i politici devono considerare criticamente le risposte degli insegnanti per trasformare le condizioni di lavoro e i curricula accademici.

KEYWORDS
Artificial Intelligence in Education, teachers' perceptions, primary school
Intelligenza artificiale nell'istruzione, percezione degli insegnanti, scuola primaria

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Introduction

The rapid progress in computer technology and data processing has expedited the advancement and implementation of artificial intelligence in various spheres of life and academic inquiry. Due to its capabilities and its profound impact on innovation, artificial intelligence is extensively employed in diverse domains owing to its potential capacity to propose remedies and enhancements to an array of problems, such as the amelioration of medical practices, the management of businesses and workforces, and the progression of educational technology. The fusion of technology engenders a substantial number of innovations and reshapes the societal, cultural, and economic landscape. The utilization of technology will inevitably undergo an increasingly intricate and sophisticated development in due course. The English language is extensively utilized as a universal means of communication. It has been acknowledged as a lingua franca of the 21st century for over three decades, thereby rendering the acquisition of English language skills indispensable. Artificial intelligence can serve as a tool for educators to facilitate instructional and instructional design or to support the scaffolding strategies of teachers and monitor students' progress and learning achievements. The progression of educational technology and digital platforms, such as educational learning applications, learning management systems, and virtual classrooms, can be harnessed to provide more effective support in the teaching and learning of a language. The employment of information and communication technologies contributes to the transformation of the learning process towards an environment centered on the student. Consequently, in order to ascertain the readiness of teachers to address the needs of their students, it is essential to scrutinize the perspectives of teachers regarding the utilization of artificial intelligence technology in their pedagogical practices. It is imperative to acknowledge and comprehend the viewpoints, experiences, expectations, and long-term utilization objectives of stakeholders during the adoption of AI technologies in order to ensure its pedagogically significant and sustainable utilization. Although numerous studies investigate the utilization, impact, and objectives of AI technology from the perspective of students (Khare et al., 2018; Dizon & Tang, 2020; Soria et al., 2021; Fahmi & Cahyono, 2021), studies focusing on the perspectives of teachers regarding the use of AI technology in primary schools, particularly in the context of teaching English as a second language, receive insufficient attention. The perceptions of teachers are ultimately intertwined with various factors that influence the utilization and adoption of technology in their classrooms. Consequently, this article aims to examine the perceptions of teachers concerning

the English language in primary schools and their continued intention to employ artificial intelligence technology in their teaching contexts.

1. Theoterical Literature

The theory of continuity of technology, an integrated theory that combines the Technology Acceptance Model, the Expectations Confirmation Model, and the Cognitive Model, has been developed to forecast the long-term utilization of technological innovations (Liao, et al. 2009). Composed of six variables derived from the variables examined in the three models, namely confirmation, satisfaction, perceived utility, perceived ease of use, aptitude, and intention to continue the information system, the theory of continuity of technology provides a comprehensive framework for understanding the factors influencing the continued use of technology. Perceived utility, as described by Huang (2021), refers to an individual's belief in the capacity of a product or new technology to enhance productivity in accomplishing a given task, thereby indicating the user's efficiency. The level of acceptance of the technology is greater when users perceive it to be useful. Confirmation, as defined by Daghan and Akkoyunlu (2016), represents users' intention to continue using the information system. Lee (2009) asserts in his study that the confirmation of expectations signifies that users have derived the anticipated benefits from their experiences with the technology, thereby exerting a positive influence on their satisfaction. Satisfaction is defined as the feeling of disappointment that arises when personal expectations and emotions related to unmet expectations are compared with users' intentions regarding the ongoing use of the information system. This assessment is based on the performance of the product or service from the consumer's perspective (Oliver, 1981; Kotler, Jatusripiak & Maesincee, 1997; Tonta & Soydal, 2010). Satisfaction is greatly influenced by confirmation. The intention to continue using the information system is linked to an individual's inclination to take action and the ability to predict their behavior (Huang, 2021). Furthermore, the intention to continue reflects the desire to persist in using or reusing an information system, which is influenced by user satisfaction and perceived utility (Daghan & Akkoyunlu, 2016; Santhanamery & Ramayah, 2018; Huang 2021). The intention for continuous use plays a vital role in the success of the system. Aptitude, or attitude toward use, encompasses individuals' opinions regarding technological resources or tools (Davis 1986; Liu, et al., 2009). Teachers' perceptions shape their attitudes and approaches to using and adapting to technology. These perceptions

ultimately influence their attitude and behavior when employing technology, leading to the intention to continuously utilize AI technology.

2. Empirical literature

The emergence of big data has facilitated the advancement of AI into a robust artificial neural network (UNESCO, 2020). As stated by Wang and Hu (2022), the significant impact that AI has had on the field of education can be attributed to the rapid progress in machine learning and big data over the previous two decades. AIEd has greatly influenced the prevailing language learning trends. Hameed and Hashim (2022) assert that the use of technology offers numerous benefits in the teaching and learning process, fostering students' engagement in learning. Learners are empowered to explore boundlessly, access materials freely, and exercise their autonomy in adaptive learning. In recent years, individuals' educational experiences have been substantially influenced by technology (Jaiswal & Arun, 2021). This is primarily due to the dynamic nature of artificial intelligence, its adaptability, and the advantages it brings to both students and educators. It caters to the diverse needs of students and enhances the competitiveness of global educational institutions (Talan, 2021). Kent (2020) also highlights the ability of artificial intelligence technology to integrate real-time content with individual learning pace, needs, and preferences. Consequently, educators are expected to acquire digital skills and proficiency in ICT (information and communication technologies) to provide students with enhanced learning experiences and outcomes. Proficiency in the English language has become imperative for competing in the global market. It is widely recognized as a second language globally and plays a vital role in international communication (Visaltanachoti, Viriyavejakulb, & Thaninratana, 2021). According to Abd Rahman et al., (2020), the demand for learning English as a second language is increasing due to the widespread use of English in economically developing countries. Hence, traditional curricula must align with technology-based education as part of Education 4.0, prioritizing problem-solving, communication, critical thinking, teamwork, and innovative thinking skills (Alakrash & Razak, 2021). The integration of technology into education has a profound impact on all aspects of life and is instrumental in enhancing a country's economy through its effects on education (Yunus et al., 2020; Loganathan & Hashim, 2020). To meet the current stringent demands of education, it is imperative to implement significant initiatives aimed at improving the quality of learning by leveraging ICT in the classroom, providing tools such as projectors and computers, and establishing digital learning

platforms. Consequently, the role of the teacher is pivotal in successfully implementing technology in English lessons (Razak et al., 2018). The immense potential of AI technology can greatly contribute to the success of language learners. The utilization of artificial intelligence (AI) technology in the realm of language acquisition is conspicuous, as evidenced by the proliferation of AI tools and applications utilized by both students and educators, such as Quizizz, Kahoot, and Google Classroom. Research indicates that technology is not only beneficial but also advantageous in the realm of language instruction and the development of language-related competencies, such as listening, speaking, reading, writing, vocabulary, and grammar. As posited by Kopcha et al. (2020), the integration of technology in pedagogical practices represents a foundational characteristic of future-oriented education, as it can be employed in both formal and informal learning contexts. It is of utmost importance for educators to meticulously design educational experiences that align with the desired learning outcomes, by effectively incorporating technology into the instructional process, particularly in the instruction of the English language, wherein the diverse needs and experiences of learners necessitate careful consideration. The implementation of AI technology in the acquisition of the English language assumes even greater significance, as it can serve as an invaluable teaching aide or seamlessly integrated within the educational journey to enhance students' learning experiences.

3. Present study

The current investigation delved into the perspectives and inclinations of English educators in primary schools in Naples regarding the utilization of AI technology in the instruction and acquisition of English. Additionally, the study shed light on the educators' viewpoints and encounters in employing AI technology to cater to the requirements of their teaching practice and student learning. The perceptions of the educators also reflected their attitude and, ultimately, their intention to consistently integrate AI technology into their teaching and learning process. The outcomes should address the following research query:

RQ1: To what degree do teacher perceptions impact the intention to consistently utilize artificial intelligence technology in the instruction and acquisition of English as a second language in primary schools?

The hypothesis in this study was formulated by the researcher based on the research query:

H1: The perceptions of teachers impact the intention to consistently utilize artificial intelligence technology.

4. Research Methodology

- *Research Design*

A quantitative approach is employed for this study, utilizing a cross-sectional survey design. The distribution of an online questionnaire via Google form serves as the chosen method. The adoption of a cross-sectional survey design is motivated by its ability to gather data from either a sample or the entire population within a specific timeframe. Furthermore, this survey design facilitates the collection of data from a substantial sample size, which aligns with the study's requirements (Showkat and Parveen, 2017). Consequently, it enables researchers to comprehend the current circumstances of a particular group or community, considering the contextual parameters of the study. This expedites the process and proves financially advantageous for administration purposes.

- *Participants*

This research employs the technique of convenience sampling. As stated by Etikan et al. (2015), convenience sampling is characterized by its convenience and ease of implementation, whereby participants are chosen based on their availability and willingness to take part (Wang & Cheng, 2020). The target population for this study comprises English teachers employed in primary schools located in Naples, Italy.

- *Instrument*

The questionnaire used in this study is adapted from reliable sources that have all demonstrated reliability and validity based on conducted studies. The questions are modified according to the context of the study. The questionnaire comprises 20 items. The Likert scale is used to examine how strongly the subjects agree or disagree with the statements on a five-point scale with the following range: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree.

- *Validity and Reliability Analysis*

Validity is defined as the extent to which a concept and a research instrument are coherent and accurately measured (Heale & Twycross, 2015). The questionnaire draft

was sent to experts for evaluation and further suggestions and corrections. Changes were then made based on their feedback and suggestions. Reliability refers to the consistency of a measurement over time and the stability of the instrument (Sürücü & Maslakçı, 2020). Cronbach's alpha coefficient was used to determine whether the item has weak or strong reliability. The range from 0.00 to 1.0 is used to indicate the level of reliability as it demonstrates internal consistency and the result is easy to analyze (Mat Nawi et al., 2019). According to Sürücü & Maslakçı (2020), a reliability score of 0.7 or higher is considered acceptable and indicates high internal consistency.

Variables	Cronbach's Alpha	Cronbach's Alpha based on the Standardized Items
Perceived Usefulness	0.949	0.953
Perceived Ease of Use	0.949	0.953
Computer Self-Efficacy	0.918	0.925
Satisfaction	0.926	0.926
Continuance Intention to Use	0.897	0.902

Table 1. The Results of Cronbach's Alpha Coefficient for research variables

The result of Cronbach's Alpha showed that all items have a value of 0.8 and above. This indicates that the items exhibit high internal consistency, which suggests that the questionnaire is reliable and can be used as a data collection source for gathering participants' perceptions and intentions of continued use for this study.

- *Data analysis*

The questionnaire data was subjected to descriptive analysis utilizing the Statistical Package for the Social Sciences (SPSS) system. This analysis aimed to derive the frequency, measures of central tendency, measures of variance, and the distribution of the data, as it has the potential to impact the overall mean. To determine the relationship between all variables within the study, Pearson's correlation analysis was employed. This analytical approach serves to ascertain the strength of the association between independent and dependent variables, which can manifest as either positive or negative. The resulting values range from -1 to +1 (Salkin, 2007; Md Yunus, Ang, Hashim, 2021). When the correlation

coefficients possess high absolute values, it signifies a heightened level of mutual covariance between the two variables (Huang, 2021). In order to explore the causal relationship and impact of teachers' perceptions (independent variables) on the intention to continuously employ AI technology (dependent variable), multiple regression analysis was conducted. This statistical technique allowed for the examination of the relationship, and a decrease in the p-value in comparison to the level of significance indicated the presence or absence of a significant relationship, respectively.

5. Results

- *Descriptive analysis*

The data obtained from the survey were examined in order to derive the means and standard deviations for each variable, as revealed in Table 2.

Variables	Mean	Standard Deviation
Perceived Usefulness	4.29	0.728
Perceived Ease of Use	3.98	0.874
Computer Self-Efficacy	4.02	0.879
Satisfaction	4.22	0.783
Continuance Intention to Use	4.15	0.778

Table 2. Descriptive Analysis for the Variables

The variables displayed in Table 2 reflect the participants' perspectives regarding the items. In light of the findings, it is evident that perceived utility manifests a higher mean value (M = 4.29), while perceived ease of use demonstrates a lower mean value (M = 3.98). Drawing upon the interpretation of the average score (EPRD, 2006; Chan, DeWitt & Chin, 2018), the variables were assessed as either highly reliable or moderately reliable. All variables exhibit a standard deviation range falling between 0.50 and 0.99 (Anthony, et al., 2018), indicating moderate reliability. Consequently, it can be inferred that the data hold statistical

significance and the overall outcomes reflect favorable responses from the majority of participants in relation to the implementation of AI technology in English language instruction.

- *Correlation test*

The study employed the Pearson correlation coefficient to ascertain the magnitude of the association between the dependent variable, namely the intention to sustain usage of the information system, and the independent variables of this investigation, which encompass the perception of utility, the perception of ease of use, computer self-efficacy, and satisfaction. The said association is categorized as either positive or negative, contingent upon the scale ranging from -1 to +1, as indicated by Salkin (2007) and Md Yunus, Ang, and Hashim (2021).

	PU	PE	CP	ST	IN
PU	1.000				
PE	.887	1.000			
CP	.907	.922	1.000		
ST	.943	.919	.932	1.000	
IN	.959	.959	.969	.979	1.000

Note. IN = intention; PU = perceived usefulness; PE = perceived ease of use; CP = computer self-efficacy; ST = satisfaction,

*Correlation is significant at the 0.01 level.

Table 3. The results of correlation of factors

The tabulated information in Table 3 showcased the implementation of factor analysis. The statistical connection between two continuous variables underwent assessment through the utilization of Pearson's correlation. It is strongly advised that factor loads surpass a threshold of 0.40, as recommended by Salkin (2007). The IN and ST component demonstrated the most substantial correlation out of all the factors, amounting to 0.979. This value implies a remarkably robust and positive association. Conversely, the PU and PE factor exhibited the weakest correlation at 0.959. All correlation coefficients for each element were greater than zero, indicating a positive relationship between the two variables. Overall, the range of correlations fell between 0.80 and 1.0, indicating a markedly high positive association across all components. The p-value of < 0.01 yielded results

that signify the significance of every individual factor. Consequently, this serves as concrete evidence of convergent validity and reliability.

- *Regression test*

Multiple regression was used in this study to predict the intention of continued usage of AI technology based on the following independent variables: perceived utility, perceived ease of use, computer self-efficacy, and satisfaction. The intention of continued usage of the information system was considered as the constant or dependent variable in this analysis. The data was normally distributed. The result of the multiple regression analysis is reported in the following table.

Model	Coefficient	t-Value	Sig.
IN	.084	4.256	.000
PU	.225	16.867	.000
PE	.216	21.022	.000
CP	.232	20.650	.000
ST	.312	20.672	.000

Note. PU = perceived usefulness; PE = perceived ease of use; CP = computer self-efficacy; ST = satisfaction

*Regression is significant at $p < 0.05$.

Table 4. The results of multiple linear regression of the teachers' perceptions on the continuous usage intention of AI technology

Model	df	F	R^2	Sig. *
Regression	4	15362.447	.995	.000[b]
Residual	300			

Table 5. The results of ANOVA in multiple regression

A noteworthy regression equation was discovered (F(4) = 15362.447 p < .000), exhibiting an R2 of .995. The regression model that was fitted can be expressed as follows: Intention = .084 + .312 (SATISFACTION) + .232 (COMPUTER SELF-EFFICACY) + .216 (PERCEIVED EASE OF USE) - .225 (PERCEIVED OF USEFULNESS). The overall regression was found to be statistically significant (R^2 = .995, F (4,300) = 15362.447, p = <.000). It was determined that perceived usefulness, perceived ease of use, computer self-efficacy, and satisfaction significantly predicted the continuous usage intention of AI technology (β = .084, p = <.000). The p-value was lower than the significance level of .005, indicating statistical significance. Hence, it can be deduced that all the aforementioned variables influenced the continuous usage intention of ESL teachers towards technology. The results confirm the hypothesis, and the summary is tabulated as follows (Table 6):

Hypothesis	Condition
Hypothesis 1: Teachers' perceptions influence the continuous usage intentionof artificial intelligence technology.	Valid

Table 6. The established hypothesis

6. Discussion

The results have shown that the perceptions of teachers, or the independent variables in this study which are perceived usefulness, perceived ease of use, computer self-efficacy, and satisfaction, have a significant relationship with the intention to continuously use AI technology by English teachers in their teaching and learning practice. All variables exhibit a robust positive correlation and significant influence (β = .084, p = <.000) on teachers' continuous intention to use AI technology. According to Rusdin (2018), teachers' perceptions and understanding of educational innovation have an impact on their choices, behaviors, and instructional strategies. A multitude of credible research also demonstrates the advantageous effects of integrating AI tools, applications, and learning platforms into the teaching and learning processes (Loganathan & Hashim, 2020; Ghoneim & Elghotmy, 2021). The utilization of AI technology in the classroom holds the potential to aid teachers in facilitating student learning and enhancing the effectiveness of lesson plans. Among all the factors, the satisfaction component exhibits the highest correlation (0.979), indicating a very strong positive association. In contrast to users' intentions regarding the continuous

usage of an information system, satisfaction is defined as the feeling of disappointment when personal expectations and emotions surrounding unmet expectations are compared to the performance of a product or service from the consumer's perspective (Oliver, 1981; Kotler, Jatusripiak & Maesiincee, 2000; Soydal, 2008). According to studies, perceived usefulness, computer self-efficacy, enjoyment, perceived behavioral control, attitude, habit, and prior behavior are the next strongest indicators of continued intention to use a system, followed by satisfaction (Lee, 2010; Dahan & Akkoyunlu, 2016; Wang, Lau & Leow, 2019). Previous research demonstrates that satisfaction influences the intention to continue using technology (Lin et al., 2005; Udo, Bagchi & Kirs, 2011; Lin, 2012; Bagci & Celik, 2018). These investigations conclude that satisfaction is the primary factor contributing to the acceptance-discontinuance anomaly in system usage. Therefore, satisfaction has an impact on an individual's intention to continue using new technology in the teaching and learning process. Perceived ease of use exhibits the lowest correlation, which is 0.907. This can be attributed to external and internal barriers that affect teachers' perceptions and their intention to continue using AI technology. The COVID-19 pandemic has disrupted the integration of AI technology in the classroom, forcing teachers to adapt to teaching on digital platforms. Through various AI tools and applications, teachers are employing AI technology as an alternative method for teaching English as a Second Language (Kent, 2021; Alsadoon, 2021; Bernardo et al., 2021). However, the complexity of AI technology or a system may impede the desire to continue utilizing it. The adoption of AI technology depends on teachers' ability to effectively manage it. If users perceive technology as easy to use, their acceptance of the technology is likely to be higher. Personal variables such as lack of digital literacy and skills, anxiety, and interest can contribute to obstacles for teachers in utilizing AI technology (Hameed & Hashim, 2022; Chiu & Chai, 2020). Past studies have also identified external factors such as infrastructure, time constraints, students' lack of readiness, and poor internet connections that impact teachers' use of technology in the classroom (Boonmoh, Jumpakate & Karpklon, 2021; Kaumba et al., 2021).

Conclusions

In summary, due to the rapid advancement of technology, it is highly probable that the traditional structure of classrooms will be superseded by an environment driven by artificial intelligence (AI). The results obtained from this investigation validate the notion that teachers' perspectives play a role in influencing their

inclination to continue utilizing AI technology in their instructional approaches. The integration and application of AI technology are inevitable, as evidenced by previous research, and its impact on the realm of education is expected to be substantial as time progresses. The utilization of English as a universal language for communication imparts an influence on the methodologies employed for English instruction. Given that teachers serve as the primary channels through which students acquire fresh knowledge within educational settings, it is crucial to consider their viewpoints on artificial intelligence and their intentions to implement such technology. The domain of AI in education has demonstrated a notable capability to adapt teaching and learning processes in alignment with the demands of the twenty-first century and the digital era, thus fulfilling the contemporary educational needs of present-day students. This is congruent with the UNESCO's Technological Innovation in Education (2021-2025) blueprint, which strives to establish equitable opportunities for all individuals to derive advantages from the technological revolution, particularly in terms of innovation and knowledge, guided by the fundamental principles of fairness and inclusivity.

References

Aimiuwu, E. (2022). Preventing pandemic diseases: An augmented reality & artificial intelligence model. *International Journal of Technology in Education*, 5. 321-332. 10.46328/ijte.231.

Akdamar, N. S. & Sütçü, S. S. (2021). Effects of Digital Stories on the Development of EFL Learners' Listening Skill. *Education Quarterly Review*, 4(4), 271-279.

Alakrash, H. M., & Razak, N. A. (2020). Towards the Education 4.0, Readiness Level of EFL Students in Utilising Technology-Enhanced Classroom. *International Journal of Innovation, Creativity and Change*, 13, 161-182.

Alsadoon, R. (2021). Chatting with AI Bot: Vocabulary Learning Assistant for Saudi EFL Learners. *English Language Teaching*, 14.

Antony, E., Deb, D., Sridhar, K., Kumar, V., & Meena, D. (2018). A regression model to predict seed filling in ruzi grass (Brachiaria ruziziensis). *Range Management and Agroforestry*, 39, 301-306.

Başar, T. & Şahin, L. (2021). Technology Integration in Teaching English as a Foreign Language: A Content Analysis Study. *Journal of Educational Technology and Online Learning*. 5. 10.31681/jetol.972577.

Bernardo, A.B.I., Cordel, M.O., II., Lucas, R.I.G., Teves, J.M.M., Yap, S.A. & Chua, U.C. (2022). Using Machine Learning Approaches to Explore Non-Cognitive Variables Influencing Reading Proficiency in English among Filipino Learners. *Educ. Sci,* 11, 628.

Chan, S.F. DeWitt, D. & Chin, L. (2018). The Analysis of Cultural and Intercultural Elements in Mandarin as a Foreign Language Textbooks from Selected Malaysian Public Higher Education Institutions. *Malaysian Online Journal of Educational Sciences*, 6(1).

Chehimi, G. & Alameddine, M. (2022). The Making of a 21st Century English Language Teacher during the Pandemic. *International Journal on Social and Education Sciences*. 4:101-120.

Chounta, I. A., Bardone, E., Raudsep, A., & Pedaste, M. (2021). Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support their Practice in Estonian K-12 Education. *International Journal of Artificial Intelligence in Education.* 32. 10.1007/s40593-021-00243-5.

Chiu, T. K. F., & Chai, C. (2020). Sustainable Curriculum Planning for Artificial Intelligence Education: A Self Determination Theory Perspective. *Sustainability*, 12(14), 5568.

Creswell, John & Hirose, Mariko. 2019. Mixed methods and survey research in family medicine and community health. *Family medicine and community health*. 7.

Dağhan, G. & Akkoyunlu, B. 2016. Modeling the continuance usage intention of online learning environments. *Computers in Human Behavior*, 60, 198-211.

Davis, F. D. 1989. Perceived usefulness, perceived ease of use and user acceptance of Information technology. *MIS Quarterly*, 13(3), 319–339.

Dizon, G. & Tang, D. (2020). Intelligent personal assistants for autonomous second language learning: An investigation of Alexa. *The JALT CALL Journal*. 16. 10.29140/jaltcall.v16n2.273.

Etikan, Ilker. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*. 5(1).

Fahmi, M., & Cahyono, B. (2021). EFL students' perception on the use of Grammarly and teacher feedback. *JEES - Journal of English Educators Society.* 6. 18-25. 10.21070/jees.v6i1.849.

Ghoneim, N. & Elghotmy, H. (2021). Using an Artificial Intelligence Based Program to Enhance Primary Stage Pupils' EFL Listening Skills. *Journal of Education Sohag University.*

Guo, H. Zhou, L. Ma, Z. Tian, Z. Zhou, F. (2021). Promising Immunotherapies against COVID-19. *SAR Journal Science and Research*, 4, 19-28, 10.18421/SAR41-04.

Hafa, H. & Moubtassime, M. (2021). The Use of ICT in Learning English: A Study of Students in Moroccan Universities. *SAR Journal - Science and Research*. 4, 19-28. 10.18421/SAR41-04

Hameed, S.B. & Hashim, H. (2022). Challenges Faced by Teachers in Integrating 4th Industrial Revolution (4IR) Technology in Teaching English as a Second Language (ESL). *Creative Education*. 13, 1792-1809.

Heale, R & Twycross, A. 2015. Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3): 66– 67.

Huang, C.H. 2021. Exploring the Continuous Usage Intention of Online Learning Platforms from the Perspective of Social Capital. *Information*, 12, 141.

Jaiswal, A., & Arun, C. J. 2021. Potential of Artificial Intelligence for Transformation of the Education System in India. *Potential of Artificial Intelligence for Transformation of the Education System in India*. 17(1), 142–158.

Mansour, H., Abdelsabour, T., Aboulnaga, A., Messad, S., Alary, V., Osman, M., Elsayed, M., & Juanès, X. (2022). Taha et al Local breed resilience CIHEAM Perform a129. *CIHEAM Publication*. 121-131.

Kazim E, Koshiyama A. S, Hilliard A, Polle R. (2021). Systematizing Audit in Algorithmic Recruitment. *Journal of Intelligence*, 9(3), 46.

Kent, D. 2020. A room with a VUI – Voice user interfaces in the TESOL classroom. *Teaching English with Technology* 20(3): 96-124.

Khare, K., Stewart, B. & Khare, A. (2018). Artificial Intelligence and the Student Experience: An Institutional Perspective. *IAFOR Journal of Education* 6: 63-78.

Kopcha, T., Neumann, K., Ottenbreit-Leftwich, A. & Pitman, E. 2020. Process over product: the next evolution of our quest for technology integration. *Educational Technology Research and Development*, 68.

Liao, C.C. & Palvia, P. & Chen, J.L. 2009. Information technology adoption behaviorlife cycle: Toward a Technology Continuance Theory (TCT). *International Journal of Information Management - INT J INFORM MANAGE* 29: 309-320.

Lindner, Annabel & Romeike, Ralf. (2019). *Teachers' Perspectives on Artificial Intelligence*. 12th International conference on informatics in schools.

Loganathan, N. & Hashim, H. (2020). Millennial Teachers' Use of Technology in ESL Classroom: A Review of Literature. *International Journal of Academic Research in Business and Social Sciences.* 10 (12), 907-923.