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AI tools in teaching: EFL teachers' perceptions of usefulness, challenges, and the role of designation and AI-training

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ABSTRACT

This study aims to investigate the integration of artificial intelligence (AI) into the teaching of English as a foreign language (EFL) at Bangladeshi Universities, focusing on teachers' perceptions of its benefits and challenges. A mixed-methods research design was employed, with a 19-item survey administered to 123 EFL teachers across 20 universities. Qualitative data were collected through semi-structured interviews with 5 teachers. Reliability and validity were assessed through pre-testing and Cronbach's alpha for internal consistency. Member checking and triangulation also contributed to the trustworthiness of qualitative data collected. Quantitative analysis used mean, standard deviation (SD), factor analysis, and chi-square tests, complemented by qualitative thematic analysis. Chi-square test results indicate no significant difference in teachers' designations regarding challenges ($p > 0.05$). However, teachers with AI training do significantly better than those without in recognizing AI-generated EFL content ($p = 0.03$). The qualitative findings show that teachers perceive AI as a tool that enhances teaching strategies, offers better time management, and facilitates innovative instructional practices. However, concerns about maintaining academic integrity prevail. Despite these challenges, the study emphasizes an optimistic outlook towards the role of AI in teaching English. It suggests integrating AI tools into EFL classrooms and proposes structured training programs to fully leverage their potential to enhance teaching effectiveness and improve learning outcomes.

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1. INTRODUCTION

The rapid growth of artificial intelligence (AI) is now reshaping educational frameworks worldwide, bringing new tools worthy of consideration for enhancing pedagogical practices and learning experiences. According to a study, AI can revolutionize higher education by supporting improved instructional methods, streamlining administrative functions, and providing tailored learning experiences [1]. It can be observed in this respect that, within the English as a foreign language (EFL) teaching context, AI aids teachers through dynamic assessment and adaptive lesson planning, which embeds new teaching strategies that cater to the diverse needs of learners. A scholar has concluded that these technological developments not only enhance linguistic skills but also nurture creativity while increasing students' involvement in learning [2]. Applied well, AI tools are poised to transform EFL education for the better by enhancing its efficiency and

learner-centeredness. This change somewhat resonates with a past study, which has suggested that the use of social media platforms, such as Facebook, in English language teaching (ELT) increases interactivity in learning and enhances students' participation [3].

To this end, higher educational institutions in Bangladesh include English language courses to enhance students' reading, writing, listening, and speaking abilities. The traditional components of these courses include quizzes, presentations, and exams to assess student performance [2]. With AI, the possibility exists that these assessments can be improved, along with the tailoring of teaching. According to a study, AI tools can help teachers tailor lessons to meet each student's individual needs [4]. Scholars prove that Duolingo and ChatGPT are widely used in creating interactive activities when planning lessons [5], [6]. Furthermore, tools like Grammarly and ProWritingAid give instant feedback on writing. This will make the teacher focus more on the minute details of teaching language and instructions [7]. Another study demonstrated that these e-tools were effective in helping college students in Bangladesh improve their English skills through YouTube videos [8].

Despite its great potential, significant challenges lie ahead for the implementation of AI in education. Teachers face numerous challenges when using AI due to insufficient training, limited resources, and financial constraints [9]. Additionally, an investigation highlighted that insufficient IT skills and restricted access to technology are significant barriers to the effective use of AI [10]. Furthermore, issues of teacher autonomy and the potential for detrimental effects on student creativity and critical thinking reflect further impediments [6]. Notably, a study cautions against overdependence on AI, which may render learners overly reliant and ultimately diminish their crucial problem-solving skills [11]. Similarly, past studies underlined the importance of motivational strategies in teaching, where tools are to be aligned with pedagogical goals to make sure that learners will stay engaged [12], [13]. Overcoming such challenges is crucial if the benefits that AI can bring to EFL classrooms are to be realized.

Most of the existing literature on the use of AI in EFL teaching focuses on its general advantages and barriers, while neglecting the actual integration of AI in contexts such as Bangladesh. In fact, a scholar identifies a lack of comprehensive studies that examine how EFL teachers perceive and use AI tools in their practices [9]. Earlier studies have already highlighted how collaborative tools, such as blogs, wikis, and Google Docs, can support language learning; however, their integration with AI remains somewhat limited [14]. Similarly, a recent study highlights the professional challenges teachers faced during the pandemic and emphasizes the urgent need for training teachers in digital tools [15]. This study aims to fill that gap by investigating the experiences of Bangladeshi EFL teachers, examining their perceptions of the usefulness of AI, the challenges they encounter, and the impact of factors such as professional designation and AI training. Considering the sample size and the number of universities covered, this is the most recent and comprehensive study of its kind.

This would be important, not only in contributing to the understanding of the role of AI in EFL education in Bangladesh but also for broader implications in any global educational context. The paper examines the practical applications and challenges of integrating AI, interpreting the findings that could guide educators, institutions, and policymakers in effectively utilizing AI to enhance language education. The findings aim to inform strategies for maximizing the benefits of AI while addressing its challenges, ultimately contributing to more effective and personalized teaching practices worldwide.

AI inclusion context in Bangladeshi EFL Teaching, particularly the use of AI tools in EFL instruction, has gained immense importance in recent times in Bangladeshi universities. This brings benefits and challenges for students to improve their language learning. AI tools, such as ChatGPT, Grammarly, and Quillbot, automate routine tasks, including grading and providing feedback, allowing teachers to spend more time designing engaging and tailored lessons. Other sites, such as Bamboozle and Quizlet, offer easy-to-use quizzes and templates for both forms of assessment. Indeed, these tools provide immediate feedback on writing, grammar, and pronunciation, which encourages students to remain interested in the subject. Results of several studies show that new media and AI tools help to raise the motivation level of university students in Bangladesh [8], [13], [15]. Again, digital platforms such as YouTube and Facebook have been reported to facilitate easier language learning and improve student interaction [3], [14].

Several challenges are ahead for the inclusion of AI in Bangladeshi EFL classrooms. One major challenge is the lack of adequate teacher training in effectively using AI tools. Without proper professional development, many educators will struggle with both the technical and pedagogical use of these tools, resulting in underutilization. Moreover, unequal access to technology, particularly in rural areas, hinders the use of AI tools among students and exacerbates disparities in learning experiences. Another challenge is that students themselves resist AI-based learning because some of them are accustomed to traditional teaching methods, which hinders the broad adoption of AI in the classroom. Moreover, educators worry that AI will reduce direct teacher-student interactions and personalized feedback in the language classroom. Additionally, cultural factors such as the lack of region-specific content in AI applications and the feeling of being overwhelmed by rapid technological changes—known as “technostress”—among teachers further complicate

the integration of AI into EFL classrooms [16]–[18]. Countering these barriers will require infrastructure, long-term teacher training, and policies to facilitate the desired integration of AI.

This study is theoretically framed by the technological pedagogical content knowledge (TPACK) model, which emphasizes the integration of technology, pedagogy, and content knowledge within teaching [19]. It can be seen from two core aspects: teachers' perceptions about the usefulness of AI and challenges in AI integration. The framework highlights how AI tools, such as ChatGPT and Grammarly, will ultimately support EFL instruction through the personalization of feedback, automation of grading, and improvement in lesson planning [2], [20]. However, challenges such as inadequate training and infrastructure need to be overcome for effective integration [11]. Examining these dimensions, the framework aligns with the principles of TPACK to explore how teachers can effectively integrate AI into their practice, considering pragmatic challenges.

2. METHOD

2.1. Research design

This study employs a mixed-methods research design that combines both quantitative and qualitative approaches to answer the research questions comprehensively. Mixed-methods designs exhibit flexibility, allowing statistical analysis alongside deeper exploration of individual experiences [21]. The respondents of this research are university EFL teachers from Bangladesh. The focus will be on their official designations, teaching experience, and training in AI tools. This twofold approach offers an in-depth understanding of how teachers perceive the benefits and challenges of AI in EFL education, as well as how these perceptions evolve in relation to their roles and experiences.

2.2. Participants

An online survey using Google Forms was conducted in July 2024 with 123 EFL teachers from 20 universities. Simple random sampling was utilized in the selection of participants [22]. It also included five experienced EFL teachers who were specifically chosen to be interviewed with a structured approach. These participants were selected based on their experience in teaching, past use of AI in EFL teaching, and readiness to help with the study. Their responses offered valuable insights into how professional titles and training in AI influence their experiences and perspectives.

2.3. Instruments

The survey was the primary tool in collecting numerical data, consisting of 19 items adapted from reliable sources [13], [17], [23], [24]. The survey was divided into three parts: personal information, perceptions of the usefulness of AI, and problems or issues associated with using AI in EFL classrooms. All parts were carefully constructed to ensure validity in attaining the research objectives. To increase its reliability, the questionnaire was tested with 30 participants. Cronbach's alpha was calculated for each part, yielding scores above 0.80, which indicates strong internal consistency, as per scholars [25]. Additionally, three experts reviewed the semi-structured interview guide developed for the qualitative part of this study to ensure its validity and reliability. The protocol listed eight open-ended questions that examined how professional title and AI training affected teachers' views and experiences. The interviews allowed for deep discussions, where participants could share their personal thoughts and expand on their answers more thoroughly.

2.4. Data collection

Quantitative data were collected through an online survey distributed to participants via Google Forms. Respondents were given clear instructions and sufficient time to complete the questionnaire. In this context, the qualitative component consisted of semi-structured interviews with five EFL teachers. The pre-investigation and expert opinion on the interview questions validated the reliability and authenticity of the data collection instruments, thereby asserting their effectiveness in answering the research objectives. Quantitative data were collected through an online survey distributed to participants via Google Forms. Respondents were given clear instructions and sufficient time to complete the questionnaire. In this context, the qualitative component consisted of semi-structured interviews with five EFL teachers. The pre-investigation and expert opinion on the interview questions validated the reliability and authenticity of the data collection instruments, thereby asserting their effectiveness in answering the research objectives.

2.5. Data analysis

Quantitative data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, such as means and standard deviations (SDs), were used to understand the tendencies and dispersion within the dataset [26]. Factor analysis, especially principal component analysis (PCA), was used to determine the significant factors influencing teachers' perceptions. PCA helps reduce the dimensionality of

data while retaining considerable variance; hence, it provides information about the principal components of teachers' responses [27].

Chi-square tests were conducted to examine the associations between categorical variables, such as teachers' designations and their perceptions of challenges arising from AI, as well as AI training and their ability to distinguish content generated by AI. This non-parametric method is appropriate for examining associations between categorical variables and testing for statistical significance [28]. Qualitative data from the interviews were analyzed thematically. Thematic analysis involved coding the transcripts from interviews, followed by organizing these codes into common themes such as challenges of integrating AI into teaching and the influence of professional titles on educators' experiences. This brought a deeper understanding of the contextual factors influencing teachers' perspectives [29]. Triangulation of the quantitative and qualitative findings further added to the validity of this study by cross-verifying insights emanating from different data sources [30], [31].

While the qualitative sample of 123 teachers provided meaningful perspectives, the analysis prioritized depth of emerging themes over formal saturation metrics. Similarly, quantitative analyses focused on identifying significant relationships relevant to the research aims, with effect sizes to be reported in subsequent work. These approaches appropriately balanced exploratory and confirmatory objectives within study's scope.

3. RESULTS AND DISCUSSION

A total of 123 EFL teachers participated in the study, representing 20 different universities in Bangladesh. In-depth interviews were conducted with five expert teachers. The quantitative data were analyzed through means, SD, factor analysis, and chi-square tests. Qualitative themes included benefits, challenges, and training needs for AI. Findings were triangulated to explore the integration of AI in EFL classrooms.

3.1. Findings from the survey

3.1.1. Demographic profile of the respondents

Table 1 presents the demographic profile of the study's participants (n =123) reveals a diverse representation across several key categories. The majority of respondents are female (57.7%), with males comprising 42.3% of the sample. In terms of professional designation, the majority of participants are lecturers (47.2%), followed by assistant professors (31.7%), associate professors (11.4%), and professors (9.7%). The distribution is relatively even; 30.9% of the teachers have between 0 and 3 years of teaching experience, 24.4% have between 4 and 6 years of teaching experience, 26.0% fall within a bracket of 6 and 10 years of teaching experience, and 18.7% have more than 10 years of teaching experience. Surprisingly, only a small part of the participants reported receiving training in AI, at 13.0%, while 87.0% have not. The above demographic information fully describes the sample of this study, illustrating the distribution of differences in gender, experience, and exposure to AI training among Bangladeshi higher education EFL teachers.

Table 1. Demographic profile of the study participants

Demographic variable	Category	Count (n =123)	Percentage (%)
Gender	Male	52	42.3
	Female	71	57.7
Designation	Lecturer	58	47.2
	Assistant professor	39	31.7
	Associate professor	14	11.4
	Professor	12	9.7
Experience	0-3 years	38	30.9
	4-6 years	30	24.4
	6-10 years	32	26.0
	10+ years	23	18.7
AI training	Yes	16	13.0
	No	107	87.0

3.2. EFL teachers' perceptions of the usefulness of AI integration

3.2.1. Descriptive statistics (mean and standard deviation) of items on the usefulness of AI integration

Table 2 provides an overview of how Bangladesh EFL teachers perceive the use of AI tools in higher education. It ranges from how AI helps improve teaching skills, increases student participation, enhances efficiency, personalizes learning, and offers diverse content. The average scores range from 4.07 to 4.30 on a 5-point scale, reflecting overall positive views; most teachers agree that AI is beneficial. The highest score, 4.30, highlights that teachers especially appreciate the ability of AI to provide a wide range of teaching materials. SDs, ranging from 0.61 to 0.78, indicate moderate agreement with some variation in responses.

Table 2. Mean and SD of perceptions toward AI integration

Items	Mean	SD
AI tools are effective for improving the teaching proficiency of teachers	4.16	0.61
AI tools are effective in increasing students' engagement and motivation to learn English	4.07	0.78
AI tools will be able to enhance the efficiency and effectiveness of Bangladeshi EFL higher education teaching in the future.	4.17	0.73
AI tools make language learning easier and personalized	4.17	0.73
AI tools provide access to diverse content, which is very effective for teaching and learning	4.30	0.66
The institutions do not have enough technical support to integrate AI in the classroom	4.12	0.70

3.2.2. Factor analysis of items on the usefulness of AI integration

A factor analysis (Table 3) of the items measuring perceptions of Bangladeshi EFL teachers regarding the usefulness of integrating AI tools in higher education classrooms revealed several important insights. Items have ranged from F to K, addressing perceptions concerning the effectiveness of AI tools in improving teaching proficiency and enhancing students' engagement and overall efficiency in the future. The result provided six factors, which have been labeled as PC1 to PC6. Of these, PC1 accounted for the highest variance (49%), followed by PC2, accounting for 17%. The remaining components contributed progressively less variance to the observed data. The loadings of the items on these components reflect the weight of each perception on the overall variation in the dataset. For example, "AI tools are effective for improving teaching proficiency" has a strong negative loading on PC1 (-0.45), while "the institutions do not have enough technical support to integrate AI in the classroom" shows a strong negative loading on PC2 (-0.93). The explained variance is an attribute of PC1, and this component is predominant, as it accounts for nearly half of the total variance. Teachers form their perception to a great extent about the efficacy of AI tools in enhancing teaching practices.

Table 3. Factor analysis of the usefulness of AI integration

Items	PC1	PC2	PC3	PC4	PC5	PC6	Explained variance
AI tools are effective for improving teaching proficiency.	-0.45	0.03	-0.48	0.48	0.18	0.55	0.49
AI tools are effective in increasing students' engagement and motivation to learn English.	-0.44	-0.17	-0.27	-0.71	-0.41	0.17	0.17
AI tools will be able to enhance the efficiency and effectiveness of Bangladeshi EFL higher education teaching in the future.	-0.49	-0.04	-0.25	0.21	0	-0.81	0.12
AI tools make language learning easier and personalized.	-0.4	0.29	0.61	0.29	-0.54	0.11	0.08
AI tools provide access to diverse content, which is very effective for teaching and learning.	-0.44	0.11	0.43	-0.31	0.71	0.05	0.07
The institutions lack sufficient technical support to integrate AI into the classroom effectively.	-0.08	-0.93	0.29	0.19	0	0.06	0.06

3.3. Teachers' perceptions of challenges in AI integration

3.3.1. Factor analysis of items on challenges of AI integration

The revised factor analysis (Table 4) examines the remaining six items regarding challenges in integrating AI tools into EFL classrooms. From this, six principal components from the factor analysis, referred to here as PC1 to PC6, PC1 explains 31% of the total variance, followed by 20% for PC2, and subsequent components of progressively less variance. The item "using AI tools may reduce the opportunities of face-to-face learning" strongly influences this component, with a high loading on PC1, 0.50. On the contrary, "there is not enough content in AI tools to satisfy all student needs" has strong loadings with both PC1 (0.49) and PC2 (-0.51), which indicates its dual influence. The explained variance indicates that PC1 is the most influential component, as it captures almost one-third of the total variance; therefore, concerns about AI affecting traditional teaching practices and content adequacy are the principal issues among teachers.

3.3.2. Chi-square analysis: designation

Chi-square test results (Table 5) relating designation to the six items relating to challenges in integrating AI tools indicate that none of the associations are statistically significant. The highest value of chi-square observed is for the item "the students often submit plagiarized work using AI tools," which has a recorded value of Chi2 =18.25 with a p-value of 0.11. Although this varies somewhat with designation, the associated p-value is always greater than the threshold of 0.05 for significance. Other items in this set, such as "using AI tools may reduce the opportunities of face-to-face learning" and "using AI tools for teaching may hamper teacher autonomy," likewise show chi-square values that are not significant across designations.

Table 4. Factor analysis of the challenges of AI integration

Items	PC1	PC2	PC3	PC4	PC5	PC6	Explained variance
The internet connection is not always available at our institute.	0.47	-0.52	0.13	0.08	-0.45	-0.54	0.31
There is not enough content in AI tools to satisfy all of the needs of students.	0.49	-0.51	-0.15	-0.07	0.33	0.6	0.2
Students often submit plagiarized work using AI tools.	0.18	0.18	-0.88	0.36	-0.02	-0.16	0.17
I can detect plagiarized student work.	0.34	0.36	-0.17	-0.73	-0.41	0.14	0.15
Using AI tools may reduce the opportunities for face-to-face language learning.	0.5	0.36	0.21	-0.07	0.64	-0.4	0.11
Using AI tools for teaching hampers teacher autonomy.	0.38	0.41	0.33	0.57	-0.34	0.38	0.06

Table 5. Rounded chi-square test results for designation

Items	Chi2	p-value	Degrees of freedom
The internet connection is not always available at our institute.	14.39	0.28	12
There is not enough content in AI tools to satisfy all of the needs of students.	8.94	0.44	9
Students often submit plagiarized work by using AI tools.	18.25	0.11	12
I will be able to detect plagiarized student work.	7.24	0.61	9
Using AI tools may reduce the opportunities for face-to-face language learning.	8.76	0.72	12
Using AI tools for teaching may hamper teacher autonomy.	15.93	0.19	12

3.3.3. Chi-square analysis: training on AI

The re-run chi-square test results (Table 6) relating to training on AI usage and the six items produced one significant association. The item "there is not enough content in AI tools to satisfy all student needs" is related to AI training, with a chi-squared value of 9.31 and a p-value of 0.03, indicating a statistically significant relationship. This suggests that a teacher trained in AI usage is more likely to recognize the need for adequate content in AI tools. Regarding other items, such as "the internet connection does not stay on all the time" and "using AI tools for teaching may hamper teacher autonomy," the p-values are well above 0.05 and do not indicate a significant association.

Table 6. Rounded chi-square test results for training on AI usage

Items	Chi2	p-value	Degrees of freedom
The internet connection is not always available at our institute.	3.93	0.42	4
There is not enough content in AI tools to satisfy all of the needs of students.	9.31	0.03	3
Students often submit plagiarized work by using AI tools.	3.24	0.52	4
I will be able to detect plagiarized student work.	4.19	0.24	3
Using AI tools may reduce the opportunities for face-to-face language learning.	7.13	0.13	4
Using AI tools for teaching may hamper teacher autonomy.	4.55	0.34	4

3.4. Findings from in-depth interviews

3.4.1. Usefulness of integrating artificial intelligence

The teachers have stated multiple uses of utilizing AI in EFL teaching, reflecting on how AI can be beneficial in their teaching practices. As described by Teacher-1, "I personally think that because of the popularity of AI in educational institutions, teachers are trying really hard to keep up with the raising concern, and for this [reason], teachers are also improving their AI knowledge, and while doing it, they are also finding out innovative ideas that can be implemented while teaching in the classroom". Since the idea of integrating AI in Bangladeshi higher education classrooms is comparatively new, teachers need to learn more about the effective integration of AI to make it more useful. As Teacher-3 stated, "as teachers, we are also in the process of learning constantly, and AI can help us to think in a better way to conceptualize our writing and our analytical skills more effectively. So, teachers should experiment with these tools and utilize [them] to improve ourselves". However, Teacher-4 voiced a contradictory thought in this regard: "in the context of higher education in Bangladesh, AI tools have nothing to do with improving the effectiveness of teaching. It may help learners to some extent by making their earlier online search activities smarter and easier". Apparently, there is a difference of opinion about the effectiveness of AI in Bangladesh's higher education institutions, as some teachers believe it is useful for professional growth. In contrast, others doubt its impact on teaching.

3.4.2. Challenges of integrating artificial intelligence

Due to the popularity of AI tools, teachers' obstacles are more vital nowadays in identifying the original work of students. Teacher-2 demonstrates, "since these AI tools are new in the higher educational context of Bangladesh, technologically challenged teachers are finding it very hard to use them effectively, and students are taking this chance to get completely dependable to complete their assignment through ChatGPT in general". According to Teacher-4, ChatGPT is the most well-known AI tool among the students.

However, some students do not even comprehend that AI can identify their work itself. Teacher-5 also stated that "challenges come from the students' side, whether it is the original work of the students or not. To find [out] the original work of [the] students is the most challenging task to do". Another challenge claimed by Teacher-3 is that "teachers are having a hard time preparing the question paper in a way that no student can directly copy and paste their writing that is written by AI tools, and for now, this is a big challenge for the teachers". Evidently, teachers are facing various challenges in utilizing AI tools effectively in the EFL classroom; on the other hand, students are becoming dependent on AI to complete their tasks instead of thinking critically and submitting their original work.

3.4.3. Training on artificial intelligence

Most teachers agreed that one of the primary challenges in integrating AI into EFL classrooms arises from a lack of proper training on these AI tools. As Teacher-2 claimed, "teachers are very optimistic about adapting the new technologies, but here the institution has a big role to play because having proper training on AI is important even for the most senior teachers". As Teacher-3 mentioned, pedagogical training should be necessary for all teachers because it would help them to understand that they are required to learn how to enhance their teaching strategies while integrating AI in EFL classrooms. According to Teacher-4, "I would like to have seminars more than the workshops where I could learn more about the productivity of AI, how it can be, how it can help me [to] improve my skills, to help me understand where I can improve, and these should be held every 4 or 6 months". Teacher-5 also described that, "currently, perhaps the best training would be on the strategies to check for AI-based plagiarism and to improve the PowerPoint or other presentation materials that teachers prepare as a teaching aid". Teacher-3 suggested that there should be rigorous and structured training, where teachers invest their time to learn strategies for effectively integrating AI tools into EFL classrooms. To conclude, the successful integration of AI into Bangladeshi EFL classrooms depends on providing teachers with the proper training that enhances their teaching skills and enables them to adapt to new technologies.

3.5. Discussion

The study examines the EFL teachers' perceptions of the usefulness and challenges associated with using AI tools. It also investigated the association between designation and AI-related training. The study further examined the challenges that arise from it.

3.5.1. Usefulness of AI in EFL teaching

The mean values reflect the positive attitude of Bangladeshi EFL teachers toward integrating an AI tool into their teaching. Most of the items have received relatively high mean scores, which shows how AI is contributing positively to various aspects of language instruction. This perception is also reflected in a study that shows teachers appreciate the fact that integrating AI tools in teaching makes their work easier and helps save their valuable time [23]. However, the SDs indicate that while most teachers agree on the usefulness of AI in basic skills development, there may be some variation in responses, which could suggest that not all teachers are as convinced. The more variable SD for the item on increasing student engagement stood at 0.78 and could indicate that some teachers remain skeptical about AI being useful in motivating students effectively. The data collected from the interviews also showed that many teachers may agree regarding the usefulness of AI for developing basic skills. Still, not all of them are entirely convinced, a sentiment also reflected among scholars, who have stated that teachers hold optimistic views regarding AI's usefulness in teaching. Still, it is not guaranteed that it can motivate the learners in EFL classrooms [16]. Additionally, the perception that institutions lack sufficient technical support (mean =4.12, SD =0.70) highlights an area of concern that might be an obstacle to the effective implementation of AI tools. The interview data also suggests that while there is optimism about the usefulness of AI tools, successful integration will depend on addressing institutional support and infrastructure challenges.

Moreover, another study has shown that AI can be highly effective in improving teaching and learning; however, teachers must consider numerous concerns [23]. The results of the factor analysis thereby reflect a similar situation. The dominant influence of PC1, capturing approximately half of the variance, suggests that for the teachers concerned, the effectiveness of AI in general, or its ability to enhance teaching proficiency, is a primary concern. Negative loadings of PC1 and PC2 indicate that teachers feel a sense of familiarity with the possible benefits of AI but are also skeptical due to the lack of institutional support and infrastructure challenges, which is also reflected in the past study [32]. Most notably, PC2 relates strongly to perceived lack of technical support—a vital burden contributing much to the variance in the successful integration of AI tools. This suggests that, although the teachers were open to the use of AI, their positive perceptions about AI are tempered by concerns over the adequacy of infrastructure and support systems. In addition, the interview data also show that teachers are concerned about the infrastructural challenges of integrating AI tools in effective EFL teaching, a concern also noted in a past study [32]. Therefore, the data

indicate that Bangladeshi EFL teachers have taken a cautiously optimistic position, viewed the perceived usefulness of AI but linked it at the same time to institutional resources and support, and this is aligned with the TPACK framework, which views effective technology integration as an aspect of interplay amongst technological knowledge, pedagogical knowledge, and content knowledge [19].

3.5.2. Challenges of AI in EFL teaching

According to the TPACK theory, AI tools are beneficial for creating an engaging teaching and learning environment; however, there are also challenges to implementing AI tools [19]. This aligns with the results from the factor analysis, which pinpoint the features of AI tool integration that Bangladeshi EFL teachers perceive as the most critical issues. The fact that PC1 is dominant and captures 31% of the variance suggests that the top concerns of teachers regarding the potential decrease in face-to-face interactions and the adequacy of AI content are addressed. These issues, therefore, have the greatest salience for their perception of the challenges posed by AI in the classroom. Moreover, the load for both "using AI tools may reduce the opportunities of face-to-face learning" and "there is not enough content in AI tools to satisfy all student needs" is strong for both PC1 and PC2, underscoring that these are interrelated and significant concerns across the board. The concern regarding the potential decrease in face-to-face interactions aligns with a scholar [24]. Additionally, the concern regarding the adequacy of AI content is also reflected in an earlier study [33]. Furthermore, the interview data suggest that there may not be enough content to meet all students' needs, as a classroom typically accommodates multiple students with diverse needs. Teachers must conduct a needs analysis of their students and prepare lessons accordingly. A study indicated that teachers are not yet ready to utilize AI tools for teaching, as they feel that these tools will not be sufficient to meet the needs of every student [18].

The existence of separate components from PC3 to PC6, with specific loading, means that other challenges, including plagiarism and teacher autonomy, are perceived differently by teachers and can be constituted as separate issues. This statement aligns with the interview data. It is clearly stated in the interview that these challenges can be overcome by arranging diverse assessment systems, such as viva exams or in-person assessments. It was indicative of the teachers' nuanced understanding, who differentiated immediate content-related challenges from broader systemic concerns. By excluding the forward-looking item on AI shaping the future, the factor analysis refines the focus to the current challenges faced by teachers in integrating AI. This underlines that attention to content quality and preservation of traditional teaching methods are among the most valuable means for the successful integration of AI tools into EFL education.

3.5.3. Association between designation, AI-related training, and challenges

The nonsignificant associations between teachers' designation hierarchy and AI-usage challenges may suggest that challenges associated with integrating AI tools are perceived relatively uniformly across teaching roles. Such uniformity could imply that these challenges are generally understood or experienced irrespective of one's designation in the educational hierarchy. While there are some differences, especially in the perception of plagiarism problems, the general lack of significant differences could suggest that these problems are overall shared in the different profiles. This might be a consequence of the general character taken by most of the challenges brought about by AI tools, such as considering the academic integrity issue and how it has changed the traditional approach to teaching. The findings suggest that interventions aimed at addressing these challenges might be equally effective across different job roles, rather than needing to be tailored to specific designations.

This strong positive correlation between training on AI and perceived lack of content in AI tools suggests a pattern that indeed, training can affect how teachers expect from and critically evaluate AI resources. It is possible that AI training enables teachers to understand better what to expect from AI tools and, therefore, be more prepared to identify content gaps. A significant finding in this respect is that comprehensive AI training seems critical, not only regarding technical issues of these tools but also in setting the expectation right with regard to their content and capabilities. The lack of significant associations for the other items would suggest that AI training is not necessarily driving perceptions of broader challenges, such as infrastructure concerns or concerns about teacher autonomy. This is aligned with the study, which indicates that while training enhances technical competence, in most instances, it does not allow teachers to overcome other broader concerns or anxieties about the systemic issues of adopting AI because of factors such as inefficiencies in infrastructure, lack of institutional support, or impacts on traditional teaching methods and teacher independence [32]. AI training, therefore, needs to be complemented by broader institutional efforts to help address these more general challenges. Another study stated that a significant challenge is the lack of proper training programs for the teachers [1]. Giving them adequate training and support will build their confidence in using AI technologies effectively, whereas factor analysis contradicts this by revealing that it is not enough that teachers learn only about the technical skills related to using the AI tool; support must be provided in dealing with the larger structural and pedagogic changes that integrating AI really entails.

3.5.4. Implications

The study holds significant implications for theory and research, as well as for students, teachers, and educational institutions. It contributes theoretically to the discussion on how the TPACK framework, which focuses on teachers' knowledge of technology, pedagogy, and content, can be applied realistically to enhance AI tools in EFL teaching [19]. This highlights the importance of striking a balance between technical skills and effective teaching methods to integrate AI effectively into their teaching strategies. AI can make the learning process individualized and interactive for students. Still, institutions must ensure that the content generated by the AI tool meets the needs of all types of students. Additionally, the findings of this study highlight that the teachers need regular training in the use of this technology and technical support on how to integrate these AI tools into their teaching. Without proper training, it may be pretty challenging for them to use AI tools effectively.

3.5.6. Limitations

While informative, the sample of 123 EFL teachers from 20 universities is not representative of the larger Bangladeshi higher education context. A larger sample could yield more generalized findings. Moreover, the reliance on questionnaires and interviews limits the depth of insights. Other methods, such as classroom observations or case studies, may provide a more holistic view of how things are conducted. Moreover, the addition of a T-test comparing pre- and post-training data would more accurately capture changes in teachers' perceptions after AI training, providing clearer insights into its impact on attitudes and practices.

4. CONCLUSION

The study surveyed 123 participants and interviewed five Bangladeshi EFL teachers from 20 universities to gauge their perceptions about the use of AI in higher education. In the questionnaire survey and interview, most teachers showed positive attitudes toward AI for its potential to enhance existing EFL teaching, and they hold high hopes for AI in language teaching. However, concerns have been raised regarding inadequate support for technology and infrastructure, as well as a reduction in face-to-face learning. Teachers stated that they need proper, constant training and workshops to be able to cope with the technologies. Teachers also claimed that institutions need to provide the resources required for integrating AI tools effectively. On a larger scale, this study recommends that further research be conducted to mitigate the challenges associated with AI in EFL teaching. Moreover, in-class assessment practice should be revised to fit the use of AI. Further studies may investigate what revisions are needed to ensure that AI actually enhances language assessment in EFL. Although AI holds exciting promises for EFL teaching, issues of institutional support, targeted training, and refocused assessment strategies must be considered to meet the changing needs of students and teachers in a digital era.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest in this study.

ETHICAL APPROVAL

The research is being conducted in accordance with strict ethical guidelines, including obtaining informed consent with complete information about the study's purpose and the participant's right to withdraw.

DATA AVAILABILITY

Derived data supporting the findings of this study are available from the corresponding author [MMH], on request.

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