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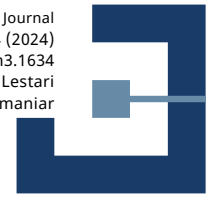

Castledown

Teachers' perceived perspective and self-efficacy in teaching EFL using Intelligent Computer-Assisted Language Learning (ICALL): A rigorous analysis

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This study aims to describe Indonesian EFL teachers' perceived perspective and self-efficacy in EFL teaching using ICALL, reveal the prominent factor influencing each variable, and examine the effect of the perceived perspective on their self-efficacy. This study used a cross-sectional survey design with a quantitative approach. There were 284 Indonesian EFL teachers taught in secondary schools chosen using a voluntary sampling technique as the respondents. Data were obtained by employing a Perceptify-ICALL questionnaire with forty items using a six-point Likert's scaling method (α = .839). Data were analyzed using descriptive statistics, hierarchical multiple regression, and MANOVA. Results showed that teachers' perceived perspective was in a very high category, but not for their self-efficacy. The prominent factor influencing their perspective was the support and facilities provided by the school and government in succeeding EFL teaching using ICALL. Whereas the most influencing factor of their self-efficacy was their skills in operating computers and AI. Another finding was the fact that the teachers' perceived perspective significantly affected teachers' mastery experience.

This study suggests that Indonesian EFL teachers' perceived perspective in EFL teaching using ICALL is well constructed, but their efficacy is on the contrary due to lower skills in operating computers and AI-powered devices or programs. Future professional development programs in improving the teachers' computer and AI-operation skills are suggested to be undertaken as well as bringing the ICALL-based approach to EFL learning.

Keywords: Indonesian EFL teachers, perception, self-efficacy in ICALL, AI-integrated teaching skills

Introduction

Intelligent computer-assisted language learning (ICALL) is a fast-developing field that harnesses the power of artificial intelligence and computer technology to improve language learning, particularly for English as a Foreign Language (Bontogon et al., 2018; De la Vall & Araya, 2023; Weng & Chiu, 2023). This novel approach leverages advanced deep learning (DL) and machine learning (ML) techniques to produce personalized learning experiences in EFL that correspond to individual demands, abilities, and learning styles (AlHarbi, 2022; Jiang, 2022). ICALL allows learners to assess their English ability while also identifying areas for improvement and offering tailored feedback and coaching to help them overcome specific obstacles (Khang et al., 2023). For example, ChatGPT is a deep learning technique based on the GPT-3.5 architecture that analyzes discourse using a deep neural network with hundreds of millions of parameters (Roumeliotis & Tselikas, 2023). This enables individuals to systematically carry out different instructions, ranging from searching for necessary information to writing English compositions (Geirhos et al., 2020; Klimova et al., 2023). Other well-known instances of deep learning are Quillbot and Grammarly, which use a range of natural language processing techniques for lightning-fast paraphrasing, editing, and translation tasks (Raheem et al., 2023). The three examples of AI utilized in EFL learning presented above are frequently employed collaboratively to produce better discourses. Thus, the ICALL approach provides a variety of opportunities and benefits for EFL learners to easily undertake autonomous learning.

Tafazoli et al. (2019) state that ICALL has been introduced since the late 1980s to provide effective language learning assistance. The novelty of this approach lies in the existing consideration of including artificial intelligence through the implementation of computer-assisted language learning (CALL). This learning approach uses AI-powered computer-assisted tools to help learners study language effectively, where this learning mode simultaneously promotes autonomous learning concepts. There are many programs, applications, or websites that can be used to enhance students' English mastery, such as ChatGPT, Perplexity, Grammarly, and DeepL for advancing writing discourse quality. Many studies have pointed out the use of those instances to construct well-structured essays and showed effective writing learning process (Al-Obaydi et al., 2023; Alam et al., 2023; Alharbi, 2023; Chiaráin et al., 2023;

Hidalgo-Ternero, 2020; Song & Song, 2023; Wu et al., 2024). Some studies also have developed AI-powered tools such as Listening Hacked (Vu et al., 2022), ALICE-Chan (Levin & Evans, 1995), Web-PVT (Tsiriga & Virvou, 2003), E-Tutor (Heift, 2010), An Scéalaí (Chiaráin et al., 2022), and AEE system (Wang, 2022), which are proven able to help learners improve their learning performance in diverse learning domains.

The discussion of ICALL has been conducted meticulously by many researchers, language experts, EFL and ESL educators, and CALL professionals, especially in its theory, practice, and future implications (Chen et al., 2022; Kuddus, 2022; Newvine, 2023; Rudzewitz, 2021; Schmidt, T., & Strasser, 2022; Tafazoli et al., 2019; Wang, 2024; Weng & Chiu, 2023). Regrettably, there seem to be limited resources to understand ICALL in the eyes of EFL teachers. Mirzaeian and Oskoui (2022) examine the student teachers' perspective on the use of machine translation as an ICALL tool and find that most of the participants get assisted and feel satisfied with the translation output. This study, however, is only limited to machine translation tools and student teachers, whose topic and setting are slenderer than the present study's objectives. In addition, Quixal (2015) shows that teachers can characterize, author, and employ ICALL materials within their devised instruction program. They also understand several computational machineries and can provide ICALL-appropriate learning activities. Unfortunately, this study might only focus on general language teachers since the study does not incorporate the respondents' inclusion criteria and has not examined how efficacious they are when carrying out the ICALL-based programs. Instead of focusing on teachers' perspectives, many studies typically tend to examine students' perspectives on learning using ICALL (Choi, 2016; Maharrani & Cochrane, 2023; Mali, 2017; Sun, 2023). Therefore, the rationale for undertaking the present study on revealing EFL teachers' perceived perspective in teaching EFL using ICALL is justifiable.

The appropriation of ICALL in EFL learning, as part of foreign language teaching and learning (FLTL), should not only be theoretically justifiable but also practically visible. To bring this learning approach to the concrete level, teachers' perceived perspective in teaching EFL using ICALL must be prominently influential. Their perspectives can drive them in conducting ICALL-based instruction such as developing an ICALL application or utilizing the existing ICALL applications to support EFL learning. Examining a teacher's perceived perspective on a certain issue is dynamic, meaning that the involved influential traits depend on the learning setting, issues covered, and learning goals (Garner & Kaplan, 2019). For instance, Lim and Yunus (2021) reveal that a teacher's perceived perspective in determining a method of teaching comprises the prevalence of suitability, feasibility, benefits, and impacts on learning. On the other hand, Nim Park and Son (2009) use two enormous traits of the teacher's perspective in computer-assisted language learning (CALL) namely internal and external factors. This study postulates findings that external factors comprising lack of time, insufficient computer facilities, rigid school curricula and textbooks, and lack of administrative support negatively affect the use of CALL in classroom learning. Whereas, the internal factors covering teachers'

limited computer skills, knowledge about computers, and beliefs and efficacy of CALL significantly affect the use of the CALL approach. Thus, teacher's perceived perspectives on certain issues might affect the practical conduct of the classroom learning process.

Another influential factor in conducting ICALL can be the teacher's self-efficacy. Nim Park and Son (2009) state that teacher beliefs and efficacy, as internal factors, significantly contribute to the decision to cope with certain issues. When EFL teachers have a well-constructed perspective of ICALL, their efficacy in conducting EFL teaching using the ICALL approach can lead them to two possibilities. First, teachers might put ICALL into their designed learning activities and encourage their students to follow ICALL-based learning (Weng & Chiu, 2023). Those with high self-efficacy believe that they can master ICALL and use it as both internal and external leading force to give the best learning experience for students amid the artificial intelligence (AI) era. This situation, however, is only attained when teachers show positive attitudes toward the challenge of the AI era (Arini et al., 2022; Sumakul et al., 2022). Second, on the contrary, teachers with good perspectives can retract themselves from the appropriation of ICALL due to lower self-efficacy. Sherf and Morrison (2020) state that perspective and self-efficacy are two independent variables with no absolute cause-effect relationship. Thus, those constructs are measured differently; perspective is measured for its true responses and opinions, and self-efficacy is measured for its mastery experience, vicarious experience, verbal persuasion, and emotional state (Bandura, 1977; Bandura, 1982; Leatemia et al., 2022; Waddington, 2023). This situation raises an awareness that revealing teachers' perceived perspective and self-efficacy in teaching EFL using ICALL can determine the practical level of permeating AI in the undertaken learning process.

Muthukrishnan et al. (2020) state that the issue of AI as learning assistance has emerged since 1956 during the Dartmouth conference and this has been an important remark that AI has been rapidly expanded to contribute progressively to the advancement of education for about 78 years. Moreover, Lim and Aryadoust (2022) state that CALL has been widely discussed by many language experts since it was invented in 1977. This implies that there should be wide theoretical and practical expansions of CALL in the last 47 years. One of which is the postulation of ICALL in the late 1980s by integrating AI into the CALL approach (Tafazoli et al., 2019). Throughout 44 years approximately, ICALL has been existing and contributed to heightening language learning quality. However, to the best of the researchers' knowledge, ICALL has just started to be the center of interest in Indonesia since 2019 when the emergence of the COVID-19 outbreak occurred. In this relevant time, many stakeholders and inventors massively developed technology-assisted learning that could ease human tasks including but not limited to learning the English language (An et al., 2021; Ko, 2017; Yu, 2019). Consequently, several free-accessed AI websites and applications start to multiply by many usages, such as the familiarization of ChatGPT, Grammarly, Perplexity, DeepL, Jenni, Clipchamp, etc. (Suryani & Fithriani, 2024; Yoshida et al., 2024).

Because of the above historic progress of ICALL and how it goes within the learning context in Indonesia, there are still limited studies revealing teachers' perceived perspective and self-efficacy in teaching EFL using ICALL. To the best of the researchers' knowledge and research, most studies only review ICALL theory along with its practice, classroom regulation, and possible future effects on language learning schemes (Chen et al., 2022; Kuddus, 2022; Newvine, 2023; Rudzewitz, 2021; Schmidt, T., & Strasser, 2022; Tafazoli et al., 2019; Wang, 2024; Weng & Chiu, 2023). In addition, regarding teachers' self-efficacy in using ICALL, the present study regrettably finds one relevant prior study undertaken by Su et al. (2018). This study claims that teachers with high self-efficacy become more confident when they can master AI-powered tools or programs. It, however, has not characterized whether the mastery of AI-powered tools becomes part of the mastery experience or not. If it becomes part of the mastery experience, we believe that the study is only limited to hierarchical analysis of influential traits on teacher's self-efficacy construction. Thus, this study is indeed dissimilar to what this present study proceeds to examine. By looking at the aforementioned studies, we believe that it is still tangibly justifiable to conduct this study. Since teachers' perceived perspective and self-efficacy could be the prompting factors of practically carrying ICALL in classroom learning, it is, therefore, necessary to analyze their perceived perspective and self-efficacy. These groundwork results are expected to depict the appropriation or reluctance attitudes of EFL teachers regarding the importance of ICALL amid the AI era. Moreover, the results can convey whether the previous studies regarding ICALL theories, practices or classroom implementations, and learning effects as broader reference resources have assisted EFL teachers in shaping their perspective in using ICALL to teach EFL. Therefore, this study aims to describe Indonesian EFL teachers' perceived perspectives and self-efficacy in EFL teaching using ICALL, reveal the most prominent factors influencing their perspectives and self-efficacy, and examine the effect of their perceived perspectives on their self-efficacy. To address these objectives, the present study formulates the following research questions:

1. How are the Indonesian EFL teachers' perceived perspectives and self-efficacy in teaching EFL using ICALL?
2. What is the dominant factor influencing teachers' perceived perspective and self-efficacy in teaching EFL using ICALL?
3. Is there an effect of teachers' perceived perspective on their self-efficacy in teaching EFL using ICALL?

Methods

This study was conducted using a cross-sectional survey design with a quantitative research approach. A cross-sectional survey was relevant to this study's objectives because the proposed research questions did not need the description of the holistic changes in teachers' perspectives and self-efficacy that further led to a longitudinal survey (Battacherjee, 2012). Moreover, the implementation of a cross-sectional survey was pertinent in examining human

constructs such as perspectives and efficacy (Battacherjee, 2012). There were 284 Indonesian teachers teaching EFL in secondary schools involved as the research respondents. They were chosen using a voluntary sampling technique. Table 1 depicts the demographic data of the respondents.

Table 1. Respondents' demographic data

Aspects	*N*	Percentage (%)
Gender		
– Male	117	41.20%
– Female	167	58.80%
Education degree		
– Bachelor	243	85.56%
– Master	36	12.67%
– Doctor	5	1.77%
EFL teaching experience		
– 1–5 years	84	29.57%
– 6–10 years	130	45.77%
– 11–15 years	66	23.23%
– >15 years	4	1.43%
School location		
– Urban	144	50.70%
– Suburban	140	49.30%

In addition to Table 1, the involving Indonesian schools were spread across East Java Province, Indonesia. The geographical locations were diverse starting from the center of metropolitan cities, mountainous areas, coastal areas, and forestry areas. The internet connection was also diverse according to the schools' geographical locations because, in East Java Province, Indonesia, the schools located in the nearby city center had better internet access as well as IoT support. In addition, regarding the issue of ICALL, urban and suburban schools in Indonesia still had dissimilarities about computer and software support. The local governments also provided different contributions in accommodating school facilities, thus, the tone of unbalanced education support existed.

Data were collected using a questionnaire named Perceptify-ICALL consisting of forty items using a six-point Likert's scaling method from strongly disagree (1) to strongly agree (6). The developed questionnaire was trialed in a small research setting with 60 participants to reveal its validity and reliability. A translational validity test administered by five experts of CALL, EFL, and educational psychology had been undertaken and the results showed a very valid category with CVR = +1.00 and CVI = 1.00 (Lawshe, 1975). Moreover, an internal consistency reliability test was performed, and the result showed a very high reliability (Cronbach's α = .839). The internal consistency reliability test also portrayed that there were no negative inter-item correlations, which implied that the questionnaire assessed a similar underlying construct. This implied that the developed Perceptify-ICALL questionnaire could be used in the main data mining process. Table 2 shows the blueprint of the Perceptify-ICALL questionnaire.

Table 2. Blueprint of Perceptify-ICALL questionnaire

Section	Variables	Subskills	Item numbers	References
I	Personal information	Name, gender, education degree, EFL teaching experience, school location	1–5	Pratama et al. (2024)
II	Perceive perspective in teaching EFL using ICALL	– Suitability – Feasibility – Facilitating supports – Benefits – Impacts on future learning	6–8 9–11 12–14 15–17 18–20	Fransson et al. (2020); Hoy & Weinstein (2013)
III	Self-efficacy in teaching EFL using ICALL	– Mastery experience – Vicarious experience – Verbal persuasion – Emotional state – Skills in operating computer and AI – EFL teaching using technology	21–23 24–26 27–29 30–32 33–36 37–40	Pratama et al. (2024)

The developed Perceptify-ICALL questionnaire was administered online enclosed with its cover letter containing the brief of research information. The administration employed the Google Form feature and used Google as data storage. The obtained quantitative data were then analyzed using descriptive statistics, hierarchical multiple regression, and MANOVA with the assistance of IBM SPSS 25. Table 3 (overleaf) shows how the data were analyzed to answer the proposed research questions (RQ).

Ethical issues

Respondents were informed about the brief of the research along with the information on how they could participate in it. The brief also comprised information on data disclosure and confidentiality to give practical insight and assurance during the participation in this research. The whole information was explicitly written in the cover letter of the questionnaire to avoid misunderstanding and ambiguity. Afterward, respondents were asked to show their consent by clicking the agreement box; this was due to an online administration format. The obtained data were stored online in a Google database owned by the corresponding author. In conducting the analysis, the researchers were accompanied by professional statistics experts to avoid testing fallacies and data interpretations.

Table 3. Data analysis technique

RQ	Data analysis to answer RQ	References
1	Quantitative data were analyzed using descriptive statistics with Swanson's quartile categorization. The obtained *M* score was transformed into *M%* by dividing *M* by the maximum score and multiplying the result with 100%. The *M%* was categorized into the following quartile: Q1 = *M%* < 25% (very low) Q2 = 25% ≤ *M%* < 50% (low) Q3 = 50% ≤ *M%* ≤ 75% (high) Q4 = *M%* > 75% (very high)	Pallant (2020); Pratama et al. (2024); Swanson (2014)
2	Quantitative data were analyzed using hierarchical multiple regression; four assumption tests covering normality, linearity, homoscedasticity, and independence of residuals were performed earliest. Each subskill of each variable was measured in its influence on the aggregate value using a hierarchical model. The highest β value with $p < .05$ among subskills of each variable was determined to be the most prominent factor influencing the variable formation.	Pallant (2020)
3	Quantitative data were analyzed using simple linear regression and MANOVA; four assumption tests covering normality, linearity, homogeneity, and multicollinearity were performed earliest. MANOVA was to find out the effects of each subskill in perceived perspective on each subskill in self-efficacy, along with the effect of the aggregate perceived perspective on the aggregate self-efficacy. In multivariate test results, a p-value of Wilk's λ was significant according to Bonferroni's adjusted α value.	Pallant (2020)

Results and discussion

Indonesian EFL teachers' perceived perspective and self-efficacy in teaching EFL using ICALL

The present study examined teachers' perceived perspective and self-efficacy in teaching EFL using ICALL by administering descriptive statistics, of which the obtained *M* score was transformed into *M%* to get Swanson's quartile categorization. Table 4 depicts the results of descriptive statistics tests for perceived perspective and Table 5 shows the teachers' self-efficacy in teaching EFL using ICALL.

Regarding Table 4, both urban and suburban teachers had a very high category of perceived perspective related to the use of ICALL for teaching EFL. However, suburban teachers believed that they still required more support to conduct the ICALL-based EFL learning process. This could be because the suburban schools might have less technological facility support than the urban ones. Their geographical locations were diverse, comprising city borders, mountainous areas, and coastal areas, affecting IoT support distribution. Even though they were confronted with some technical challenges, they believed that the use of ICALL in conducting EFL learning was suitable for the current era, visible to be applied in Indonesia with the support of Indonesian curriculum, being supported by sufficient facilities (e.g., computers, workshops, training, infrastructures, and other AI-powered devices or programs), offering multiple benefits for both teachers and students and impactful to the future learning process. This implied that Indonesian EFL teachers agreed that mastering and

permeating ICALL in their teaching and learning activities should be immediately initiated.

Table 4. Indonesian EFL teachers' perceived perspective in teaching EFL using ICALL: Urban, suburban, and aggregate

Teacher category	Variable/subskills	*M*	*SD*	*M%*	Swanson's Quartile
Urban	Perceived perspective	87.2986	2.12899	96.99%	Q4
	– Suitability	17.5069	.57932	97.26%	Q4
	– Feasibility	17.4653	.67847	97.02%	Q4
	– Facilitating supports	17.5208	.56678	97.33%	Q4
	– Benefits	17.3958	.70183	96.64%	Q4
	– Impacts on future learning	17.4097	.67330	96.72%	Q4
Suburban	Perceived perspective	79.1929	1.99603	87.99%	Q4
	– Suitability	17.6714	.69368	98.17%	Q4
	– Feasibility	13.9286	1.27309	77.38%	Q4
	– Facilitating supports	12.1286	.77592	67.38%	Q3
	– Benefits	17.7857	.57258	98.80%	Q4
	– Impacts on future learning	17.6786	.78902	98.21%	Q4
Aggregate	Perceived perspective	83.3028	4.55278	92.55%	Q4
	– Suitability	17.5880	.64243	97.71%	Q4
	– Feasibility	15.7218	2.04112	87.34%	Q4
	– Facilitating supports	14.8627	2.78413	82.57%	Q4
	– Benefits	17.5880	.66937	97.71%	Q4
	– Impacts on future learning	17.5423	.74363	97.45%	Q4

Table 5. Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL: Urban, suburban, and aggregate

Teacher category	Variable/subskills	M	SD	M%	Swanson's Quartile
Urban	Self-efficacy	98.0278	2.69406	81.69%	Q4
	– Mastery experience	14.8958	.58798	82.75%	Q4
	– Vicarious experience	14.9236	.82003	82.90%	Q4
	– Verbal persuasion	15.3472	1.03990	85.26%	Q4
	– Emotional state	14.8819	.90451	82.67%	Q4
	– Skills in operating computer and AI	18.3611	1.51270	76.50%	Q4
	– EFL teaching using technology	19.6181	.95344	81.74%	Q4
Suburban	Self-efficacy	76.3929	3.00526	63.66%	Q3
	– Mastery experience	11.2286	1.34294	62.38%	Q3
	– Vicarious experience	12.0214	.75358	66.78%	Q3
	– Verbal persuasion	11.3643	.87500	63.13%	Q3
	– Emotional state	12.0357	.75303	66.86%	Q3
	– Skills in operating computer and AI	14.3429	1.15535	59.76%	Q3
	– EFL teaching using technology	15.4000	1.32925	64.17%	Q3
Aggregate	Self-efficacy	87.3627	11.20317	72.80%	Q3
	– Mastery experience	13.0880	2.10569	71.71%	Q3
	– Vicarious experience	13.4930	1.65269	74.96%	Q3
	– Verbal persuasion	13.3838	2.21397	74.35%	Q3
	– Emotional state	13.4789	1.65043	74.88%	Q3
	– Skills in operating computer and AI	16.3803	2.42114	68.25%	Q3
	– EFL teaching using technology	17.5387	2.40624	73.07%	Q3

Based on Table 5, the urban teachers' self-efficacy in teaching EFL using ICALL was classified in a very high category (*N* = 144, *M* = 98.0278, *SD* = 2.69406, *M%* = 81.69%), which was better than the suburban teachers' perceived perspective (*N* = 140, *M* = 76.3929, *SD* = 3.00526, *M%* = 63.66%). Uniquely, there was a tendency for both urban and suburban teachers to consider themselves lacking skills in operating computer and AI-powered devices or programs. This meant that the teachers were not confident about their skills in operating currently familiar AI-powered tools such as ChatGPT, Perplexity, Quizlet, Canva, and many more. In terms of operating skills, they also lacked confidence that they could make use the AI-powered tools or programs in the teaching process, such as demonstrating operation tutorials and solving problems related to technological issues (e.g., not-working AI-powered tools or programs). Aggregately, Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL was lower than their perceived perspective, especially in mastering skills in operating computers and AI-powered tools or programs.

Dominant factor influencing teachers' perceived perspective and self-efficacy in teaching EFL using ICALL

Hierarchical multiple regression was employed to reveal the prominent factor influencing teachers' perceived perspectives and self-efficacy in teaching EFL using ICALL. The study performed the four assumption tests at a glance, and the results were considered normal. Table 6 shows the prominent factor influencing the teachers' perceived perspective and Table 7 depicts the dominant factor affecting the teachers' self-efficacy in teaching EFL using ICALL.

Table 6. Indonesian EFL teachers' perceived perspective in teaching EFL using ICALL: Urban, suburban, and aggregate

Variable	Factors influencing variable	*B**	Order of prominent factor influencing variable
Perceived perspective (urban)	– Suitability	.272	4
	– Feasibility	.319	2
	– Facilitating supports	.266	5
	– Benefits	.330	1
	– Impacts on future learning	.316	3
Perceived perspective (suburban)	– Suitability	.348	4
	– Feasibility	.638	1
	– Facilitating supports	.389	3
	– Benefits	.287	5
	– Impacts on future learning	.395	2
Perceived perspective (aggregate)	– Suitability	.141	5
	– Feasibility	.448	2
	– Facilitating supports	.612	1
	– Benefits	.147	4
	– Impacts on future learning	.163	3

*All factors showed $p < .05$.

Based on Table 6, the urban teachers' perceived perspective was predominantly

influenced by the benefits offered by ICALL when it was implemented in the EFL learning process. In this case, they viewed ICALL as an advantageous approach to support EFL teaching amid the AI era, thus, it was suggested to be implemented. Whereas, for suburban teachers, the most influencing factor that formed their perspective was the feasibility factor. In this case, they believed that it was really visible to apply ICALL-based EFL teaching and learning process in Indonesia due to Indonesian curriculum supported the use of technology-assisted learning and blended learning mode. However, aggregately, the respondents believed that the support and facilities provided by the school and government became the most influencing factor in succeeding EFL teaching using ICALL (N = 284, B = .612, p = .000).

Table 7. Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL: Urban, suburban, and aggregate

Variable	Factors influencing variable	B*	Order of prominent factor influencing variable
Self-efficacy (urban)	– Mastery experience	.218	6
	– Vicarious experience	.304	5
	– Verbal persuasion	.386	2
	– Emotional state	.336	4
	– Skills in operating computer and AI	.561	1
	– EFL teaching using technology	.354	3
Self-efficacy (suburban)	– Mastery experience	.447	1
	– Vicarious experience	.251	5
	– Verbal persuasion	.291	4
	– Emotional state	.251	6
	– Skills in operating computer and AI	.384	3
	– EFL teaching using technology	.442	2
Self-efficacy (aggregate)	– Mastery experience	.188	4
	– Vicarious experience	.148	5
	– Verbal persuasion	.198	3
	– Emotional state	.147	6
	– Skills in operating computer and AI	.216	1
	– EFL teaching using technology	.215	2

*All factors showed p < .05

According to Table 7, the most influencing factor on urban teachers' self-efficacy in teaching EFL using ICALL was their efficacy in perceiving skills to operate computer and AI-powered devices or programs. This implied that, the highest their efficacy in operating computer and AI-powered devices/tools or programs, the highest their self-efficacy in teaching EFL using the ICALL approach. Meanwhile, the suburban teachers' self-efficacy in teaching EFL using ICALL was predominantly determined by their mastery experience. This showed that the suburban teachers needed to take several relevant courses, workshops, classes, or seminars regarding the implementation of ICALL-based EFL teaching and learning process. Aggregately, Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL was mostly influenced by their skills in operating computers and AI. This referred to the fact that permeating ICALL in the EFL learning process required teachers' skills in operating computers and

AI. Moreover, the second most influencing factor was the skills of integrating technology in EFL teaching. In brief, the better the teachers' skills in operating computer and AI-powered devices or programs along with the skills in utilizing every mode of technology, the higher their self-efficacy in teaching EFL using ICALL.

Effect of teachers' perceived perspective on self-efficacy in teaching EFL using ICALL

The effect of teachers' perceived perspective on their self-efficacy in teaching EFL using ICALL was examined using MANOVA. The study had met the four assumption tests. Both aggregate and subskills values of perceived perspective were used as the independent variables. At the same time, both aggregate and subskills values of self-efficacy were employed as the dependent variables. Table 8 shows the results of the undertaken MANOVA.

Table 8. Effect of perceived perspective on self-efficacy

Variables	Self-efficacy	Mastery experience	Vicarious experience	Verbal persuasion	Emotional state	Skills in operating computer and AI	EFL teaching using technology
Perceived perspective	.416 [a]	.006 [a*]	.975 [a]	.026 [a]	.620 [a]	.569 [a]	.961 [a]
Suitability	.684 [b]	.328 [b]	.480 [b]	.916 [b]	.619 [b]	.261 [b]	.935 [b]
Feasibility	.409 [c]	.707 [c]	.688 [c]	.033 [c]	.284 [c]	.872 [c]	.262 [c]
Facilitating supports	.293 [d]	.374 [d]	.072 [d]	.017 [d]	.476 [d]	.381 [d]	.555 [d]
Benefits	.391 [e]	.253 [e]	.734 [e]	.529 [e]	.663 [e]	.579 [e]	.810 [e]
Impacts on future learning	.642 [f]	.560 [f]	.201 [f]	.374 [f]	.752 [f]	.787 [f]	.932 [f]

[a] Wilk's λ = .388; [b] Wilk's λ = .944; [c] Wilk's λ = .831; [d] Wilk's λ = .840; [e] Wilk's λ = .945; [f] Wilk's λ = .937.
*There was a significant effect (using Bonferroni's adjusted α value of .008).

Table 8 portrays that among diverse models of causal nexus, the effect of aggregate perceived perspective on mastery experience was considered very significant using Bonferroni's adjusted *α* value of .008. This conveyed that teachers' perceived perspective involving all factors or subskills in teaching EFL using ICALL significantly contributed to the formation of their mastery experience (e.g., comprehension of ICALL for EFL class, participation in ICALL-based EFL learning mocks, or field experience of teaching EFL using ICALL). In other words, a good perceived perspective towards the use of ICALL in teaching EFL (e.g., understanding ICALL suitability, feasibility, supports, benefits, and impacts) enhanced the teachers' confidence. This, consequently, rose a self-inner force that they were capable of conducting the ICALL-based EFL learning process due to sufficient experience, knowledge, and practice conceived by themselves.

Discussion

This study found that Indonesian teachers' perceived perspective in teaching EFL using ICALL was in the very high category. This finding was similar to several studies examining teachers' perspectives, however, in various focuses and scopes (Almusawi et al., 2021; Gregersen et al., 2021; Zhang & Zhan, 2014). In connection with ICALL, Mirzaeian and Oskoui (2022) revealed similar research findings that teachers portrayed a positive view of the use of machine translation as an ICALL tool. Moreover, they believed that the tool was suitable to support their translation learning process. This finding was similar to what the present study obtained, where the suitability factor got the highest score among other subskills of perceived perspective. This implied that the suitability of a teaching technique or method for the existing curriculum, era, learning environment, and student characteristics influenced how teachers viewed it (Quixal, 2015). Some studies also added that teachers' perspectives in determining a teaching technique or method could be influenced by their characteristics (Al-Mahrooqi et al., 2015; Cakmak, 2008). For instance, a teacher with reluctance to technology might have a negative perspective on ICALL, and, thus, they would not appropriate it during the classroom learning process. This was possible since teachers' perspectives could be influenced by many traits such as personality, knowledge, and perceived thinking skills. Thus, based on the study result for the first research question, Indonesian EFL teachers' perceived perspectives in teaching EFL using ICALL are generally influenced by the suitability of ICALL with several school and pupil conditions.

Regarding teachers' characteristics that might affect the level of perceived perspective in teaching EFL using ICALL, the geographical location of the school where the teachers taught could be considered important to be examined. This study found that, generally, urban and suburban teachers' perceived perspectives in teaching EFL using ICALL were in a very high category. However, only facilitating support subskill was differently obtained by urban and suburban teachers. The urban teachers conceived facilitating support subskill higher than the suburban teachers. This finding confirmed that facilities, infrastructures, and other supports had been the substantial traits in forming teachers' perceived perspective in teaching EFL using ICALL. Similarly, Biber et al. (2022) and Bahari (2022) also found that teachers' perspectives on the success of appropriating technology-assisted learning instruction (TALI) could be predetermined by the school's efforts in affording pertinent supports that facilitated the TALI-based learning process. Many studies also believed that the existing learning facilities contributed to the advancement of learners' learning performance (Eze et al., 2020; Mood et al., 2022; Otchere et al., 2019; Sianipar et al., 2023; Thuan & Liu, 2018). This, therefore, implied that suburban teachers might conceive a lower perspective toward the existing learning supports facilitating ICALL-based EFL teaching and learning activity due to their lack of standardized ICALL devices, tools, and programs as well as the compatible internet with high bandwidth to accommodate numbers of users. These banks of problems about learning facilities might be less experienced by urban teachers because most urban schools provided better facilitating support than suburban schools

(Dolph, 2017; Knoblauch & Chase, 2015; Wu et al., 2020). Therefore, the geographical location of the school could be another important issue in constructing teachers' perceived perspective in teaching EFL using ICALL.

In addition, this study found that teachers' perceived perspective was not the only variable that forced them to apply certain learning approaches, in this case, the application of ICALL in teaching EFL. Before the practical level, their self-efficacy in teaching EFL using ICALL might have influenced their teaching practice, whether they wanted to appropriate ICALL in teaching EFL or not. This study found that Indonesian EFL teachers' self-efficacy in conducting ICALL-based EFL teaching was lower than their perceived perspective, especially in the subskill of operating computers and AI-powered devices or programs. Such phenomena portrayed that the teachers' lack of confidence in bringing ICALL into the classroom practice was due to their low efficacy in mastering the skills in operating computers and AI-powered devices or programs. Some studies agreed that if teachers did not master certain skills required in succeeding the teaching and learning process, their beliefs decreased due to less optimism occurring within themselves (Bhati & Sethy, 2022; Ernest, 1989). Psychologically speaking, their teaching mentality was obstructed by the incapacitation of performing certain skills, and, thus, they consequently hid it from students to create a better persona. Even so Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL was still considered in a very high category.

Similarly to their perceived perspective, teachers' self-efficacy might also show diverse findings according to their school's geographical locations. For instance, this study found that urban teachers' self-efficacy in teaching EFL using ICALL was way higher than that of suburban teachers. This finding must have been expected by the researchers, and probably many practitioners and educators, because many cases and studies revealed that suburban teachers' self-efficacy in teaching EFL was lower than that of urban teachers (Knoblauch & Chase, 2015; Liaw, 2017; Surana, 2021) under dissimilar rationales. For example, Yüksel (2011) examined teachers' self-efficacy in using technology in EFL classrooms, in which the results showed that suburban teachers perceived low efficacy due to unsupportive learning environments (e.g., mountainous or coastal areas) and unreliable school facilities. Alibakhshi et al. (2020) and Wyat (2018) also stated that urban teachers were more efficacious in appropriating modern technology-based games in the class to support their teaching. And, still, many studies revealed that urban teachers help their students enhance their learning performance in EFL classes due to the highly perceived efficacy (Alibakhshi et al., 2020; Mojavezi & Tamiz, 2012). This study recapped this finding as a tragedy that had been long-lived occurring with no effective troubleshoots. Henceforth, accelerating suburban teachers' self-efficacy in teaching EFL using ICALL was another humanity coursework that we together required to solve.

After looking at the teachers' perceived perspective and self-efficacy in teaching EFL using ICALL, the researchers thought it was essential in determining the most predicting or dominating factor of their perceived perspective and self-efficacy. First, the study found that Indonesian EFL teachers' perceived

perspective in teaching EFL using ICALL was predominantly influenced by facilitating supports, which this result was relevant to the previous discussion. In addition, this study found that the most influential factors for urban and suburban teachers' perceived perspectives were different. The urban teachers' perceived perspective in teaching EFL using ICALL was mainly influenced by their perspective on ICALL benefits in learning. Whereas the suburban teachers' perceived perspective was mostly predetermined by their perspective on the feasibility of implementing the ICALL approach. In this case, it could be implied that urban teachers viewed ICALL as important to be implemented in teaching EFL since it offered various benefits, including learning benefits for students and professional development for the teachers amid the AI-computer era. However, this might be a different priority with the suburban teachers who thought that the implementation feasibility was the most prominently affecting factor. This was understandable as the suburban teachers were mostly worried about facilities and support to conduct ICALL-based EFL learning like what had been explained previously. Therefore, it was a duty for all of us to focus on the specific traits and solve the existing problems for urban and suburban teachers to be able to use ICALL in the teaching of EFL.

Second, the Indonesian EFL teachers' self-efficacy in teaching EFL using ICALL was mainly influenced by skills in operating computers and AI-powered devices or programs. It was imperative that mastering skills in operating computers and AI-powered devices or programs could determine their efficacy in conducting EFL teaching using ICALL, as Yang et al. (2024) found. This aggregate finding was similar to urban teachers' condition, where their efficacy was also predominantly influenced by skills in operating computers and AI-powered devices or programs. Some studies conveyed that teacher's self-efficacy was also connected to specific skills required to be mastered. For instance, Al-Seghayer (2022) conducted a study examining teacher's self-efficacy in using technological-assisted language learning (TALL) to teach EFL. The study showed that the teachers perceived low self-efficacy due to lower skills in comprehending language-learning technological knowledge, mastering language-learning pedagogical technology, and integrating technology into EFL instruction. Similarly, Kahveci (2021) found that teachers' self-efficacy in conducting digital literacy must be supported by the highness of skills in ICT training and mastering kinds of digitalized texts or discourses. This had been a considerable nexus: when teachers wanted to boost their efficacy in accomplishing something, they were required to master the required skills. The mastery of certain knowledge or competence might be obtained from the autodidact learning process (Yang et al., 2024), which further enhanced the mastery experience. This study found that mastery experience of ICALL-based EFL learning became the most predicting factor of the suburban teachers. This meant that teachers' mastery of ICALL-based EFL learning could lead them to attain better efficacy. Many studies also agreed that mastery experience mainly affected the formation of teachers' self-efficacy (Kahveci, 2021; Pratama et al., 2024; Pratama & Lestari, 2018; Regier, 2021; Wilson et al., 2020; Yang et al., 2024). Therefore, mastering relevant skills in operating computers and AI-powered devices or

programs and enhancing the mastery of ICALL-based EFL learning were two factors that influenced the high self-efficacy in teaching EFL using ICALL.

In connection with the mastery of ICALL-based EFL learning that could enhance teachers' mastery experience, this study also found additional facts that teachers' mastery experience had been significantly influenced by the aggregate perceived perspective. This meant that teachers' perceived perspective (involving all factors) contributed to the formation of their mastery experience. Teachers would be more efficacious for their conceived mastery by the advancement of their perspective in teaching EFL using ICALL. In other words, the more positive the perceived perspective towards the use of ICALL in teaching EFL (e.g., understanding ICALL suitability, feasibility, supports, benefits, and impacts), the more confident the teachers to teach EFL using ICALL. Regier (2021) supported the present study's findings by arguing that a good perspective on a certain teaching approach or technique might lead to better efficacy in appropriating the approach or technique. Similarly, some studies claimed that teachers' perspective might affect their self-efficacy because perceiving a good perspective could bring positivity to carry out tasks (Abousselam et al., 2016; Sherf & Morrison, 2020; Shiau et al., 2020; Zebardast et al., 2011). Therefore, studying teachers' perceived perspective was not only an effort to picture their views of things or phenomena; rather, it could affect their efficacy in accomplishing teaching tasks and other related responsibilities such as conducting consultancy, creating a conducive learning milieu, and using English as a language instruction (Pratama et al., 2024).

Following the above discussion, this study showed several strategies as the practical implications. Improving ICALL-based teaching expertise through increased self-efficacy in using AI-powered tools has the potential to dramatically revolutionize the teaching of languages. First, training programs should aim to enhance teachers' confidence in utilizing AI tools. Workshops and online courses should give teachers hands-on experience with these tools while stressing their practical uses in language education. Second, building a support system, such as dedicated helpdesks or online forums, can help teachers incorporate AI tools into their practice. Providing easy access to resources such as lessons and troubleshooting tips boosts confidence. Third, introducing AI technologies gradually allows teachers to gain proficiency without becoming overwhelmed. Beginning with basic applications and gradually progressing to more complicated systems can help teachers acquire confidence and experience. Fourth, encouraging teachers to collaborate and share best practices for using AI tools helps promote a positive learning environment. Peer input and shared experiences can increase self-efficacy and offer practical insights into successful implementation. Fifth, constantly monitoring the impact of AI tools on teaching results and reflecting on these evaluations enables teachers to understand their efficacy and adapt techniques, accordingly, boosting their confidence in employing these technologies. By concentrating on these strategies, teachers can improve their self-efficacy and effectively use AI-powered tools to boost language learning experiences through ICALL-based learning scenarios.

Conclusion

Based on the linear information in the findings and the discussion, the current study concludes that Indonesian EFL teachers are eager to apply ICALL to EFL teaching. However, their self-efficacy in teaching EFL through ICALL needs to be improved. To boost their self-efficacy, they must evaluate the influential problems or factors. This study identified various elements that can assist them increase their self-efficacy in teaching EFL via ICALL, one of which is proficiency with computers and AI-powered devices or programs. Teachers can equip these skills and demonstrate mastery by participating in a variety of learning activities such as seminars, tutorials, workshops, or MOOCs. They are also advised to engage in self-directed study if necessary to extend their perspective and subject comprehension. Furthermore, while the use of ICALL is not always considered the most significant, the teacher believes that ICALL should be developed in light of the current time of computer and AI use. Teachers understand that this affects not only education, but also jobs and business, and that their students must be prepared to face these challenges. Furthermore, because the AI era is inextricably related to the Alpha generation, EFL education in particular must incorporate AI and computers into learning a language. This is intended to facilitate EFL instruction while simultaneously introducing students to AI advancements. As a result, this study strongly proposes that the Indonesian government do multiple field surveys in urban and suburban locations, focusing on everything that can help instructors improve their ICALL mastery skills. Aside from that, this study recommends additional research into the real behaviors of urban and suburban EFL teachers when using computers and AI-powered gadgets or apps. This can be an undisputable representation of how EFL teachers utilize ICALL based on the problems and supports they have naturally perceived in their classrooms. This will be an extension of ICALL theory and practice in the EFL learning domain. Referring to the above summary, this study's finding contributes to the field of ICALL in portraying the perception and efficacy of implementing an ICALL-based approach in their EFL classroom learning activities. By knowing this, the Indonesian government could set up relevant professional development programs to prepare their readiness to teach EFL in this AI era. Besides, school stakeholders need to observe their readiness (e.g., infrastructure and human resource readiness) in implementing ICALL-based learning. As this study is limited to the context of Indonesian secondary schools, future studies are expected to examine similar research topics in the context of higher education, an institution where ready-to-work graduates and the workforce are prepared. Future studies are also suggested to assess the teachers' ICALL comprehension and skill mastery to guarantee that they perceive the correct conception and procedure of ICALL.

References

Abousselam, N., Naudé, L., Lens, W., & Esterhuyse, K. (2016). The relationship between future time perspective, self-efficacy and risky sexual behaviour in the Black youth of central South Africa. *Journal of Mental Health, 25*(2), 176–183.

Al-Mahrooqi, R., Denman, C., Al-Siyabi, J., & Al-Maamari, F. (2015). Characteristics of a good EFL teacher: Omani EFL teacher and student perspectives. *Sage Open, 5*(2), 2158244015584782.

Al-Obaydi, L. H., Pikhart, M., & Klimova, B. (2023). ChatGPT and the general concepts of education: Can artificial intelligence-driven chatbots support the process of language learning? *International Journal of Emerging Technologies in Learning (iJET),* 18(21), 39–50.

Al-Seghayer, K. (2022). Saudi EFL teachers' self-efficacy in technology-assisted language learning (TALL). *International Journal of Applied Linguistics and English Literature, 11*(2), 53–64.

Alam, S., Usama, M., Alam, M. M., Jabeen, I., & Ahmad, F. (2023). Artificial intelligence in global world: a case study of Grammarly as e-tool on ESL learners' writing of Darul Uloom Nadwa. *International Journal of Information and Education Technology, 13*(11).

Alharbi, A. A. (2022). The uses of machine learning (ML) in teaching and learning English language: a methodical review. *Journal of Education – Sohag University, 93*(93).

Alharbi, W. (2023). AI in the foreign language classroom: A pedagogical overview of automated writing assistance tools. *Education Research International, 2023,* 1–15.

Alibakhshi, G., Nikdel, F., & Labbafi, A. (2020). Exploring the consequences of teachers' self-efficacy: a case of teachers of English as a foreign language. *Asian-Pacific Journal of Second and Foreign Language Education, 5*(1), 23.

Almusawi, H. A., Durugbo, C. M., & Bugawa, A. M. (2021). Innovation in physical education: Teachers' perspectives on readiness for wearable technology integration. *Computers & Education, 167,* 104185.

An, Z., Wang, C., Li, S., Gan, Z., & Li, H. (2021). Technology-assisted self-regulated English language learning: Associations with English language self-efficacy, English enjoyment, and learning outcomes. *Frontiers in Psychology, 11,* 558466.

Arini, D.N., Hidayat, F.S., Winarti, A., & Rosalina, E. (2022). Artificial intelligence (AI)-based mobile learning in ELT for EFL learners: The implementation and learners' attitudes. *International Journal of Educational Studies in Social Sciences (IJESSS) 2*(2).

Bahari, A. (2022). Teacher identity in technology-assisted language learning: Challenges and affordances. *E-Learning and Digital Media, 19*(4), 396–420.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122.

Bhati, K., & Sethy, T. P. (2022). Self-efficacy: Theory to educational practice. *The International Journal of Indian Psychology, 10*(1), 1123–1128.

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices.* University of South Florida.

Biber, S. K., Biber, M., & Erbay, H. N. (2022). Teachers' perceptions on technology-assisted mathematics teaching and the interactive activities. *Education and Information Technologies, 27*(5), 6913–6945.

Bontogon, M., Arppe, A., Antonsen, L., Thunder, D., & Lachler, J. (2018). Intelligent computer assisted language learning (ICALL) for Nêhiyawêwin: An in-depth user-experience evaluation. *Canadian Modern Language Review, 74*(3), 337–362.

Cakmak, M. (2008). Concerns about teaching process: student teachers' perspective. *Educational Research Quarterly, 31*(3), 57–77.

Chen, X., Bear, E., Hui, B., Santhi-Ponnusamy, H., & Meurers, D. (2022, July). Education theories and AI affordances: design and implementation of an intelligent computer assisted language learning system. *In International Conference on Artificial Intelligence in Education* (pp. 582–585). Springer International Publishing.

Chiaráin, N. N., Gunning, N. R., Nolan, O., & Comtois, M. (2023). Filling the SLaTE: examining the contribution LLMs can make to Irish iCALL content generation. In *Proceedings of the 9th Workshop on Speech and Language Technology in Education (SLaTE)* (pp. 176–181).

Chiaráin, N. N., Nolan, O., Comtois, M., Gunning, N. R., Berthelsen, H., & Chasaide, A. N. (2022, May). Using speech and NLP resources to build an ICALL platform for a minority language, the story of An Scéalaí, the Irish experience to date. In *Proceedings of the Fifth Workshop on the Use of Computational Methods in the Study of Endangered Languages* (pp. 109–118).

Choi, I. C. (2016). Efficacy of an ICALL tutoring system and process-oriented corrective feedback. *Computer Assisted Language Learning, 29*(2), 334–364.

De la Vall, R. R. F., & Araya, F. G. (2023). Exploring the benefits and challenges of AI-language learning tools. *The International Journal of Social Sciences and Humanities Invention, 10,* 7569–7576.

Dolph, D. (2017). Challenges and opportunities for school improvement: Recommendations for urban school principals. *Education and Urban Society, 49*(4), 363–387.

Ernest, P. (1989). The impact of beliefs on the teaching of mathematics. In P. Ernest (Ed.), *Mathematics teaching: The state of the art* (pp. 249–254). Lewes: Falmer.

Eze, S. C., Chinedu-Eze, V. C., Okike, C. K., & Bello, A. O. (2020). Factors influencing the use of e-learning facilities by students in a private Higher Education Institution (HEI) in a developing economy. *Humanities and social sciences Communications, 7*(1), 1–15.

Fransson, G., Holmberg, J., & Westelius, C. (2020). The challenges of using head mounted virtual reality in K-12 schools from a teacher perspective. *Education and Information Technologies, 25*(4), 3383–3404.

Garner, J. K., & Kaplan, A. (2019). A complex dynamic systems perspective on teacher learning and identity formation: An instrumental case. *Teachers and Teaching, 25*(1), 7–33.

Geirhos, R., Jacobsen, J. H., Michaelis, C., Zemel, R., Brendel, W., Bethge, M., & Wichmann, F. A. (2020). Shortcut learning in deep neural networks. *Nature Machine Intelligence, 2*(11), 665–673.

Gregersen, T., Mercer, S., & MacIntyre, P. D. (2021). Language teacher perspectives on stress and coping. *Foreign Language Annals, 54*(4), 1145–1163.

Heift, T. (2010). Developing an intelligent language tutor. *CALICO Journal, 27*(3), 443–459.

Heift, T. (2022). Intelligent computer assisted language learning. In *Research Questions in Language Education and Applied Linguistics: A Reference Guide* (pp. 655–658). Springer International Publishing.

Hidalgo-Ternero, C. M. (2020). Google Translate vs. DeepL: Analysing neural machine translation performance under the challenge of phraseological variation. *MonTI. Monografías de Traducción e Interpretación,* 154–177.

Hoy, A. W., & Weinstein, C. S. (2013). Student and teacher perspectives on classroom management. In *Handbook of classroom management* (pp. 191–230). Routledge.

Jiang, R. (2022). How does artificial intelligence empower EFL teaching and learning nowadays? A review on artificial intelligence in the EFL context. *Frontiers in Psychology, 13,* 1049401.

Kahveci, P. (2021). Language teachers' digital literacy and self-efficacy: are they related? ELT Research Journal, 10(2), 123–139.

Khang, A., Muthmainnah, M., Seraj, P. M. I., Al Yakin, A., & Obaid, A. J. (2023). AI-Aided teaching model in education 5.0. In *Handbook of Research on AI-Based Technologies and Applications in the Era of the Metaverse* (pp. 83–104). IGI Global.

Klimova, B., Pikhart, M., Polakova, P., Cerna, M., Yayilgan, S. Y., & Shaikh, S. (2023). A systematic review on the use of emerging technologies in teaching English as an applied language at the university level. *Systems, 11*(1), 42.

Knoblauch, D., & Chase, M. A. (2015). Rural, suburban, and urban schools: The impact of school setting on the efficacy beliefs and attributions of student teachers. *Teaching and Teacher Education, 45,* 104–114.

Ko, M. H. (2017). Learner perspectives regarding device type in technology-assisted language learning. *Computer Assisted Language Learning, 30*(8), 844–863.

Kuddus, K. (2022). Artificial intelligence in language learning: Practices and prospects. *Advanced Analytics and Deep Learning Models,* 1–17.

Leatemia, L. D., van Merrienboer, J. J. G., & Susilo, A. P. (2022). Development of a questionnaire to measure teachers' student-centred perspectives based on the Onion Model. *BMC Medical Education, 22*(1), 504.

Levin, L., & Evans, D. (1995). ALICE-chan: A case study in ICALL theory and practice. In *Intelligent language tutors: Theory Shaping technology* (pp. 77–99). Lawrence Erlbaum Associates Publishers.

Liaw, E. C. (2017). Teacher efficacy of English teachers in urban and suburban schools. *Teacher Development, 21*(4), 496–510.

Lim, M. H., & Aryadoust, V. (2022). A scientometric review of research trends in computer-assisted language learning (1977–2020). *Computer Assisted Language Learning, 35*(9), 2675–2700.

Lim, T. M., & Yunus, M. M. (2021). Teachers' perception towards the use of Quizizz in the teaching and learning of English: A systematic review. *Sustainability, 13*(11), 6436.

Maharrani, D., & Cochrane, T. (2023). *Heutagogical-based ICALL environment: A framework to develop students' capability.* ASCILITE Publications, 487–491.

Mali, Y. C. G. (2017). EFL students' experiences in learning call through project based instructions. *TEFLIN Journal: A Publication on the Teaching & Learning of English, 28*(2).

Mirzaeian, V. R., & Oskoui, K. (2022). Investigating Iranian EFL student teachers' attitude toward the implementation of machine translation as an ICALL tool. *Journal of English Language Teaching and Learning, 14*(30), 165–179.

Mojavezi, A., & Tamiz, M. P. (2012). The impact of teacher self-efficacy on the students' motivation and achievement. *Theory and Practice in Language Studies, 2*(3).

Mood, D., Sheldon, R., Tabangin, M., Wiley, S., & Meinzen-Derr, J. (2022). Technology assisted language intervention (TALI) for children who are deaf/hard of hearing: promising impact on pragmatic skills. *Deafness and Education International, 24*(4), 334–355.

Muthukrishnan, N., Maleki, F., Ovens, K., Reinhold, C., Forghani, B., & Forghani, R. (2020). Brief history of artificial intelligence. *Neuroimaging Clinics of North America, 30*(4), 393–399.

Newvine, U. (2023*). Intelligent computer-assisted language learning in the English as a foreign language classroom.* University of California.

Nim Park, C., & Son, J. B. (2009). Implementing computer-assisted language learning in the EFL classroom: teachers' perceptions and perspectives. *International Journal of Pedagogies and Learning, 5*(2), 80–101.

Otchere, S. N., Afari, J. B., & Kudawes, C. (2019). Examining the relationship between school facilities and the learning environment: A case study of Oda Senior High School. *Journal of Education and Practice, 19*(26), 21–39.

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS.* Routledge.

Pratama, R. D., & Lestari, L. A. (2018). Reinforcing Indonesian EFL teacher self-efficacy: accomplishing the responsibilities and avoiding absenteeism. *Journal of English Language and Literature 10*(1), 956–965.

Pratama, R. D., Imaniar, F., Lestari, L. A., & Rochmawati, L. (2024). EFL teacher self and collective efficacy scale (ETSCE): Developing efficacy measures in teaching EFL. *Englisia: Journal of Language, Education, and Humanities, 11*(2), 161–180.

Quixal, M. (2015). *Language learning tasks and automatic analysis of learner language: connecting FLTL and NLP design of ICALL materials supporting use in real-life instruction.* [Doctoral dissertation, Universität Tübingen].

Raheem, B. R., Anjum, F., & Ghafar, Z. N. (2023). Exploring the profound impact of artificial intelligence applications (Quillbot, Grammarly and ChatGPT) on English academic writing: A systematic review. *International Journal of Integrative Research (IJIR), 1*(10), 599–622.

Regier, B. J. (2021). Examining relationships among concert band directors' efficacious sources, self-efficacy for teaching strategies, and effective teaching skills. *Journal of Research in Music Education, 68*(4), 436–450.

Roumeliotis, K. I., & Tselikas, N. D. (2023). ChatGPT and open-AI models: A preliminary review. *Future Internet, 15*(6), 192.

Rudzewitz, B. (2021). *Learning analytics in intelligent computer-assisted language learning* [Doctoral dissertation, Universität Tübingen].

Schmidt, T., & Strasser, T. (2022). Artificial intelligence in foreign language learning and teaching: a CALL for intelligent practice. *Anglistik: International Journal of English Studies, 33*(1), 165–184.

Sherf, E. N., & Morrison, E. W. (2020). I do not need feedback! Or do I? Self-efficacy, perspective taking, and feedback seeking. *Journal of Applied Psychology, 105*(2), 146.

Shiau, W. L., Yuan, Y., Pu, X., Ray, S., & Chen, C. C. (2020). Understanding fintech continuance: perspectives from self-efficacy and ECT-IS theories. *Industrial Management and Data Systems, 120*(9), 1659–1689.

Sianipar, E. C., Simalango, L. M., Manik, R. B. B., Sianturi, R., Simbolon, C. H. V. B., Herman, H., & Simanjuntak, M. M. (2023). The effect of school learning facilities on students' learning motivation at SDN 091302 Pematang Panei. *Jurnal Scientia, 12*(01), 330–334.

Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. *Frontiers in Psychology, 14*, 1260843.

Su, J., Feng, Y., & Liu, L. (2018). Research on the influence of computer-aided intelligent tutoring system on teacher's self-efficacy. *Journal of Intelligent and Fuzzy Systems, 35*(3), 2749–2759.

Sumakul, D. T. Y., Hamied, F. A., & Sukyadi, D. (2022). Artificial Intelligence in EFL Classrooms: Friend or foe? *LEARN Journal: Language Education and Acquisition Research Network, 15*(1), 232–256.

Sun, X. (2023). A case study of social learning in ICALL-based English writing course from learners' perspectives. *European Online Journal of Natural and Social Sciences, 12*(4), 388.

Surana, S. (2021). Teacher self-and collective efficacy in teaching Javanese: a study of Indonesian urban and suburban teachers. *Journal of Social Studies Education Research, 12*(2), 260–279.

Suryani, I., & Fithriani, R. (2024). Artificial intelligence tools in writing class: students' preferences and lecturers' perceptions. *Eltin Journal: Journal of English Language Teaching in Indonesia, 12*(1), 167–176.

Tafazoli, D., María, E. G., & Abril, C. A. H. (2019). Intelligent language tutoring system: Integrating intelligent computer-assisted language learning into language education. *International Journal of Information and Communication Technology Education (IJICTE), 15*(3), 60–74.

Thuan, K. Q., & Liu, W. T. (2018). A study of effects of school facilities on learning performance of vocational high school students: An empirical study. *Journal of Social Science and Humanities, 1*(5), 2600–9056.

Tsiriga, V., & Virvou, M. (2003). Modelling the student to individualise tutoring in a web-based ICALL. *International Journal of Continuing Engineering Education and Life-Long Learning, 13*(3–4), 350–365.

Vu, D. C., Lian, A. P., & Siriyothin, P. (2022). Integrating natural language processing and multimedia databases in CALL software: Development and evaluation of an ICALL application for EFL listening comprehension. *Computer Assisted Language Learning, 23*(3), 41–69.

Waddington, J. (2023). Self-efficacy. *ELT Journal, 77*(2), 237–240.

Wang, H. (2024*). The design and evaluation of intelligent computer-assisted language learning tools for beginner learners of Mandarin Chinese* [Doctoral dissertation, Trinity College].

Wang, Z. (2022). Computer-assisted EFL writing and evaluations based on artificial intelligence: a case from a college reading and writing course. *Library Hi Tech, 40*(1), 80–97.

Weng, X., & Chiu, T. K. (2023). Instructional design and learning outcomes of intelligent computer assisted language learning: Systematic review in the field. *Computers and Education: Artificial Intelligence, 4*, 100117.

Wilson, C., Marks Woolfson, L., & Durkin, K. (2020). School environment and mastery experience as predictors of teachers' self-efficacy beliefs towards inclusive teaching. *International Journal of Inclusive Education, 24*(2), 218–234.

Wu, J., Li, Y., Zhou, J., & Chen, S. (2024). The impact of intelligent personal assistants on Mandarin second language learners: interaction process, acquisition of listening and speaking ability. *Computer Assisted Language Learning,* 1–26.

Wu, Y., Zheng, X., Sheng, L., & You, H. (2020). Exploring the equity and spatial evidence of educational facilities in Hangzhou, China. *Social Indicators Research, 151*(3), 1075–1096.

Wyatt, M. (2018). Language teachers' self-efficacy beliefs: A review of the literature (2005–2016). *Australian Journal of Teacher Education* (Online), *43*(4), 92–120.

Yang, Y. F., Tseng, C. C., & Lai, S. C. (2024). Enhancing teachers' self-efficacy beliefs in AI-based technology integration into English speaking teaching through a professional development program. *Teaching and Teacher Education, 144,* 104582.

Yoshida, R., Someya, T., & Oseki, Y. (2024). Tree-planted transformers: Large language models with implicit syntactic supervision. *arXiv preprint arXiv:2402.12691.e*

Yu, Z. (2019). A systematic review on mobile technology-assisted English learning. *International Journal of e-Collaboration (IJeC), 15*(4), 71–88.

Yüksel, B. T. (2011). *Teacher efficacy beliefs of Turkish EFL teachers: A study with Turkish EFL teachers working at state primary schools* [Doctoral dissertation, Anadolu University].

Zebardast, A., Besharat, M. A., & Hghighatgoo, M. (2011). The relationship between self-efficacy and time perspective in students. *Procedia – Social and Behavioral Sciences, 30,* 935–938.

Zhang, F., & Zhan, J. (2014). The knowledge base of non-native English-speaking teachers: Perspectives of teachers and administrators. *Language and Education, 28*(6), 568–582.