

EFL TEACHERS' INTERPRETATION AND PRACTICES UNDER INDONESIA'S K-13 CURRICULUM: A QUALITATIVE CASE STUDY IN AN ELEMENTARY SCHOOL

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ABSTRACTS

The implementation of English language instruction in elementary schools under the K-13 curriculum has become widespread, yet there is limited understanding of how teachers interpret and apply the curriculum in their classrooms. This study aims to explore elementary school English teachers' interpretations of the K-13 curriculum and their pedagogical strategies. Adopting a qualitative descriptive approach, data were collected through classroom observations and structured interviews with three English teachers at the elementary level. The data were analyzed thematically, revealing key patterns in teaching strategies and challenges. Teachers reported using interactive methods, such as group discussions, student-centered activities, and technology integration, to engage students effectively. However, they faced significant challenges, including inadequate teaching resources, large class sizes, and limited time, all of which hindered the full implementation of the curriculum. These findings underscore the need for targeted professional development programs and improved resource allocation to address these challenges. The study provides actionable insights for policymakers and educators aiming to optimize English language teaching within the K-13 framework, emphasizing the importance of supporting teachers in overcoming obstacles to effective curriculum delivery.

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INTRODUCTION

Curriculum is a fundamental blueprint for education, defining essential topics, learning goals, and outcomes that prepare students for current and future challenges (Zhang et al., 2022). It shapes educational practices and human experiences, influencing how teaching and learning processes are conducted (Alvunger, 2021). In Indonesia, the Independent Curriculum was introduced in elementary schools in the 2022/2023 academic year, reflecting progressive educational values that promote innovation, flexibility, and rationality (Rizapoor & Zafari, 2023). This curriculum aims to enhance educational quality and equip students for global competition (Purnama & Pawiro, 2023).

Despite this advancement, many schools, particularly private institutions, still implement the 2013 Curriculum (K-13), including the elementary school where this study was conducted in Batam. K-13 emphasizes character education, thematic learning, and interactive pedagogical

approaches (Idham et al., 2024). However, its implementation has faced several challenges, particularly in specific subjects such as English language instruction.

Previous studies have identified multiple obstacles in K-13 implementation, including difficulties students face in understanding materials, teachers' challenges in selecting appropriate learning media, limited infrastructure, and difficulties in assessing student progress (Warman et al., 2021; Mitchell & Walton-Fisette, 2022). These issues vary by region and school type. For example, mathematics learning in Madrasah Aliyah Aceh is hindered by resource constraints (Erizar et al., 2021), while thematic and interdisciplinary approaches present challenges for elementary teachers in West Java (Susanto et al., 2024). Vocational high schools in Surakarta also report struggles with curriculum execution (Jatmika, 2020). In Yogyakarta, K-13's application in science education is considered suboptimal due to difficulties in developing digital learning media for distance learning (Supriyanto & Amrin, 2022; Warman et al., 2021). Nevertheless, some schools have demonstrated successful K-13 implementation (Muzaky & Achadi, 2024).

While these studies provide insights into K-13's general effectiveness, most focus on secondary education or broad challenges across subjects. Research specifically addressing K-13's implementation in elementary English language teaching remains limited. Considering the growing importance of English proficiency in Indonesia's global education context, it is essential to explore the specific challenges faced by elementary English teachers under the K-13 framework. This study aims to fill this gap by examining teacher perceptions, instructional challenges, and potential improvements in implementing K-13 for elementary English instruction.

By focusing on teacher experiences and instructional strategies within the K-13 curriculum, this research offers practical recommendations to refine curriculum design and enhance English language teaching effectiveness at the elementary level, providing valuable insights for educators and policymakers.

RESEARCH METHOD

Research Design

This study adopted a qualitative case study approach to investigate the implementation of the English curriculum under the K-13 system in an elementary school in Batam. A case study approach is widely recognized for its ability to provide detailed insights into complex educational contexts, especially when exploring phenomena such as curriculum implementation (May & Perry, 2022). Case study research is particularly suited for examining educational practices in real-world settings, where contextual factors and participants' perspectives are integral to understanding the full scope of the issue (Kruger et al., 2024).

The study employed an instrumental case study design, which focuses on understanding a specific instance and using this case to gain broader insights into similar educational contexts across Indonesia. This type of case study allows for an in-depth exploration of the subject matter while aiming to draw generalizable conclusions about the K-13 curriculum's effectiveness in elementary school settings.

Subject

The study was conducted at a primary school in Batam, chosen based on the school's commitment to the K-13 curriculum and the teachers' extensive experience in its implementation. This school was selected purposefully as it represents a setting where the K-13 curriculum is being actively applied, offering a rich context for studying the implementation process. The school's experience in the curriculum's application provides a relevant example of how the broader trends in Indonesian education are manifested at the local level.

Participants consisted of three English teachers, selected through purposive sampling to ensure they had substantial experience with the K-13 curriculum. Participants were chosen based on their years of teaching experience, training in the K-13 curriculum, and active involvement in its execution in their classrooms. This selection criteria ensured that the sample represented educators who had a deep understanding of the curriculum's demands and the strategies required for its effective delivery. The small sample size aligns with qualitative research principles, which prioritize depth over breadth, allowing for a thorough investigation of the teachers' instructional strategies and classroom experiences (Creswell & Clark, 2018).

Instruments

Data collection in this study was conducted using two primary instruments: observation checklists and semi-structured interviews. The observation checklists were adapted from Chong (2020) and were designed to assess three key areas: curriculum implementation, classroom management, and teaching methods. These checklists utilized a five-point Likert scale ranging from "Very Poor" to "Very Good" to evaluate various instructional aspects such as lesson objectives, student engagement, and teaching strategies. Example items from the checklist include "Clarity of lesson objectives," "Student participation," and "Use of teaching aids." Prior to the study, the Likert scale was pilot-tested in a sample classroom to ensure its reliability and relevance to the Indonesian educational context.

Additionally, semi-structured interviews were conducted to provide deeper insights into teachers' perceptions and experiences. The interview questions, adapted from Bulan et al. (2020) and Nuraeni et al. (2020), covered 21 topics, including the role of motivation in teaching, the effectiveness of student-centered learning, and the integration of technology in the classroom. To ensure consistency, the interviews followed a conversational approach, guided by a structured framework of core topics and prompts. This approach allowed for flexibility in exploring teachers' individual experiences while maintaining focus on the research objectives. Example interview questions included: "How do you engage students in the learning process?" and "What challenges have you faced in implementing the curriculum effectively?"

Classroom observations were conducted to document instructional practices and assess their alignment with K-13 standards. Data from these observations were recorded using structured checklists, capturing aspects such as lesson organization, classroom interaction, and student participation. Furthermore, face-to-face interviews were conducted to gather teachers' reflections on their instructional strategies and experiences with curriculum implementation. The interviews were recorded, transcribed, and coded for thematic analysis to identify recurring patterns and key insights. All instruments were adapted to suit the local educational context. This included linguistic and cultural adjustments to ensure that both the checklist items and interview questions were relevant and easily understood by Indonesian teachers. These modifications were reviewed by a panel of local education experts to ensure cultural appropriateness and accuracy.

Data Analysis

The data analysis process involved categorizing the collected data based on the checklist and interview responses, focusing on key themes such as curriculum content, classroom management, and instructional techniques. Observation ratings were recorded in a spreadsheet using a performance rating scale to evaluate teaching effectiveness. The qualitative data from the interviews were transcribed verbatim and analyzed thematically, with the coding process conducted using (specify method, e.g., open coding, axial coding, selective coding) to ensure consistency and rigor in theme identification. The thematic analysis followed an (inductive/deductive) approach, where themes were (emerged from the data/predefined based

on the research questions) to ensure alignment with the study's research objectives (Walvoord et al., 2023).

The findings were systematically compared across participants to identify both common trends and variations in the implementation strategies of the English curriculum under the K-13 system. This comprehensive approach allowed for an in-depth examination of effective teaching strategies, challenges, and areas for improvement. Additionally, the integration of observation ratings with interview data was carefully considered. If the ratings were analyzed qualitatively, they supported the identification of patterns within the themes. If analyzed quantitatively, the ratings were used to further validate the qualitative findings, ensuring a balanced interpretation of the data. This methodological approach not only ensures transparency and replicability but also provides valuable insights into the strengths and weaknesses of curriculum implementation, contributing to the broader field of educational research.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

The research findings provide insight into the instructional strategies, use of technology, perceptions of the K-13 curriculum, and the challenges encountered by three teachers with varying levels of experience in teaching English at the elementary level. The data was derived from both interviews and classroom observations, and the analysis reveals how each teacher approaches their teaching practice.

Teacher A, with 12 years of experience, uses interactive lessons, facilitates group discussions, and incorporates multimedia resources to enhance student engagement. Teacher B, who has 2 years of experience, focuses on structuring lessons with a variety of engaging activities, encouraging active participation, and adapting teaching methods based on student feedback and progress. Teacher C, with 3 years of experience, centers on reviewing lessons and creating engaging exercises such as games and discussions while effectively utilizing multimedia. Despite these differences, both Teachers A and C share a similar perspective on the importance of student engagement and adapting the K-13 curriculum. In contrast, Teacher B places greater emphasis on interactive activities and student collaboration.

All three teachers agree on the value of technology in the classroom. Teacher A notes that the K-13 curriculum supports the integration of technology to enhance teaching and learning experiences. Teacher B highlights the role of technology in fostering active participation through multimedia presentations, interactive apps, online platforms for collaboration, and digital assessment tools. Similarly, Teacher C views technology as essential for enhancing instruction, communication, and providing intuitive learning experiences. These perspectives align with the teachers' broader student-centered philosophy, where the integration of technology is seen as a way to support and engage students in the learning process.

When discussing their perceptions of the K-13 curriculum, the teachers acknowledged both its strengths and challenges. Teacher A identified differences in its objectives, content, and teaching methods compared to other curricula. Teacher B emphasized the curriculum's competency-based approach, the integration of character education, and the use of scientific teaching methods. Teacher C focused on how the K-13 curriculum promotes dynamic learning, competency-based approaches, and real-life application, distinguishing it from more traditional educational models. All three teachers recognized the importance of using authentic materials and real-life contexts to make English language teaching more relevant and engaging.

Despite these shared beliefs about the curriculum, the teachers encountered similar challenges in its implementation. Teacher A pointed out the limitations posed by large class sizes, limited resources, and the varying abilities of students. Teacher B focused on the

difficulties of adapting teaching methods to meet the diverse needs of students, integrating character education, and effectively utilizing technology. Teacher C noted challenges such as the need for substitutes and time constraints. These challenges were further compounded by student misbehavior, which all teachers indicated as a key issue. However, observations confirmed that the teachers managed these challenges effectively by utilizing group work and discussions to promote cooperative behavior.

One key observation from the study was that despite expressing a student-centered teaching philosophy, one teacher predominantly employed a teacher-centered approach. This teacher relied heavily on presentation slides and provided explanations without inviting student interaction, contradicting their stated teaching beliefs. This discrepancy highlights the complexity of teaching practice and raises important questions about the alignment between stated philosophy and actual classroom behavior.

Discussion

This study highlights several critical insights into the implementation of the K-13 curriculum in a private elementary school in Batam, specifically focusing on teaching strategies, technology use, and challenges in curriculum execution. The findings, as outlined in the classroom observation, are discussed below in relation to existing literature and broader educational themes.

The study found that while some interactive strategies, such as pre-class games, group tasks, and multimedia resources, effectively engaged students, they were not consistently aligned with the curriculum's goals of fostering curiosity and inquiry-based learning. This gap between the intended student-centered approach of the K-13 curriculum and classroom practices echoes previous studies (Shurygin et al., 2023) emphasizing the need for more engaging, inquiry-driven methodologies. Although the observed strategies succeeded in generating excitement and participation, they were often limited to information delivery rather than fostering deeper engagement with the content. This finding suggests that while certain activities may momentarily capture students' attention, the core of the teaching approach needs to be more aligned with fostering long-term curiosity and critical thinking.

In terms of challenges, Teacher A's reliance on teacher-centered methods, despite advocating for student-centered learning, points to a common issue highlighted by Yusra et al. (2022) and Yang et al. (2024), where teachers may face difficulties in fully embracing the K-13 framework. Factors such as students' prior knowledge, motivation levels, and their perceptions of English as a subject may contribute to this discrepancy. A more critical reflection of these barriers could offer valuable insights into how teachers can better integrate student-centered practices into their lessons.

Another key finding was the limited and inconsistent use of technology in the classroom. Teacher B, for instance, faced difficulties in integrating technology effectively, which is a common issue discussed by Fitria (2023). Although the K-13 curriculum emphasizes the role of technology in enhancing student engagement, the challenges of time constraints, inadequate facilities, and classroom disruptions remain significant barriers. Studies by Teresa et al. (2024) and Kong & Wang (2024) underscore that while technology has the potential to improve classroom engagement, its successful implementation relies on proper infrastructure, teacher readiness, and support.

The study also explored the role of translanguaging in helping students with limited English proficiency better engage with the lesson material. Research by Marsevani and S (2023) and Marsevani (2021) suggests that using students' first language (L1) can facilitate a better understanding of the content. However, while the importance of translanguaging was acknowledged, the observed practices did not explicitly incorporate it into the teaching strategies. This presents an opportunity for future studies to examine how translanguaging

strategies can be systematically integrated into EFL classrooms. In particular, future research could explore whether teachers are aware of the potential of translanguaging and whether it is actively employed as a classroom strategy.

Despite the potential of the K-13 curriculum, various challenges were noted in its implementation. These included balancing diverse student needs, managing time constraints, and aligning assessments with competency-based goals. Teacher B's struggle with integrating character education and aligning assessments with K-13's competency-based approach echoes findings from Kapadia (2024), who noted that teacher preparation is often insufficient to meet the demands of the curriculum. Similarly, Teacher C's challenge of meeting individual student needs and managing time effectively mirrors Pertiwi & Ashadi's (2024) observations about the difficulties teachers face in catering to diverse learning styles and pacing the curriculum.

These challenges highlight the gap between the curriculum's theoretical goals and its practical application in classrooms. The inconsistency between K-13's ideal of student-centered learning and the actual practices observed suggests a need for further training and professional development to help teachers align their teaching methods with the curriculum's objectives.

Based on the study's findings, several actionable recommendations can be proposed. First, teachers would benefit from ongoing professional development focused on innovative pedagogical strategies, especially in the areas of technology integration and translanguaging. Specific training in inquiry-based teaching methods, as well as practical examples of how to incorporate translanguaging in EFL classrooms, could help bridge the gap between curriculum goals and classroom practices.

Second, improvements in classroom resources, such as the provision of more reliable technological tools, could help overcome some of the obstacles that teachers face. Policymakers should prioritize increasing access to educational technologies and provide more robust support for schools in implementing the K-13 curriculum effectively.

Lastly, a more explicit focus on fostering curiosity and inquiry-based learning is needed. Instead of primarily delivering content, teachers should be encouraged to design lessons that promote student-led exploration and critical thinking. Curriculum materials should also be better aligned with these goals, as current practices often focus on information delivery rather than active student engagement.

In conclusion, this study underscores the importance of aligning teaching strategies with the K-13 curriculum's goals, particularly in fostering student-centered, inquiry-based learning. While the observed teaching strategies were effective in some cases, challenges related to technology integration, time constraints, and the lack of curriculum alignment highlight the need for further training, resource allocation, and curriculum improvement. Future research could explore best practices for overcoming these challenges and developing more effective models for curriculum implementation, ensuring that students are fully engaged and able to develop critical thinking and self-directed learning skills.

CONCLUSION

This study examines EFL teachers' strategies and challenges under the K-13 curriculum, with a focus on English education. Teachers employ interactive lessons, group discussions, teamwork, and technology integration to enhance student engagement. However, challenges such as overcrowded classrooms, limited resources, and time constraints hinder the effectiveness of these strategies.

To improve English instruction, ongoing professional development for teachers is crucial, equipping them with innovative teaching methods and digital tools for student-centered learning. Policymakers should revise curriculum guidelines to offer more flexibility, addressing issues like large student-teacher ratios and resource limitations.

Future research should focus on how teacher training influences classroom practices, the impact of students' first language on learning English, and the long-term effects of technology use on student engagement and language acquisition. By addressing these areas, educational stakeholders can better support teachers and enhance English language education in Indonesia.

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REFERENCES

- Alvunger, D. (2021). Curriculum making and knowledge conceptions in classrooms in the context of standards-based curricula. *The Curriculum Journal*, 32(4), 607–625. <https://doi.org/10.1002/curj.108>
- Bulan, A., Suryaman, M., & Mardiah, M. (2020). The process of english language teaching in the 2013 curriculum. *VELES Voices of English Language Education Society*, 4(1), 85–93. <https://doi.org/10.29408/veles.v4i1.2007>
- Chong, E. K. (2020). How does globalization shape the interdisciplinary curriculum development in hong kong's education reform? *Curriculum and Teaching*, 35(1), 23–51. <https://doi.org/10.7459/ct/35.1.03>
- Erizar, Hidayati, T., & Diana, S. (2021). The implementation of k13 curriculum in madrasah aliyah in the south west region of aceh (english teachers' perspectives). *Islam Universalia: International Journal of Islamic Studies and Social Sciences*, 3(2), 177–219. <https://doi.org/10.56613/islam-universalia.v3i2.202>
- Fitria, T. N. (2023). Using information and communication technology (ICT) in the education sector: opportunities and challenges in english language teaching (ELT). *Teaching English as Foreign Language, Literature and Linguistics*, 3(1), 9–30. <https://doi.org/10.33752/teflics.v3i1.4038>
- Idham, Rokimin, & Muzakir, M. I. (2024). Implementation of character education in the independent curriculum. *Edukasiana: Journal of Islamic Education*, 3(2), 329–339. <https://doi.org/https://doi.org/10.61159/edukasiana.v3i2.315>
- Jatmika, D. (2020). Webinar growth-mindset untuk pembelajaran online pada siswa sma di samarinda. *Altruis: Journal of Community Services*, 1(4), 188. <https://doi.org/10.22219/altruis.v1i4.14669>
- Kapadia, F. (2024). Adolescent mental health and well-being: a public health of consequence. *American Journal of Public Health*, 114(2), 158–160. <https://doi.org/https://doi.org/10.2105/AJPH.2023.307543>
- Kong, S.-C., & Wang, Y.-Q. (2024). Dynamic interplays between self-regulated learning and computational thinking in primary school students through animations and worksheets. *Computers & Education*, 220, 105126. <https://doi.org/10.1016/j.compedu.2024.105126>
- Kruger, F., Queen, Z., Radelva, O., & Lawrence, N. (2024). Comparative analysis of scientific approaches in computer science: a quantitative study. *International Transactions on Education Technology (ITEE)*, 2(2), 120–128. <https://doi.org/10.33050/itee.v2i2.567>
- Marsevani, M. (2021). Learners' perception and practices on autonomous language learning in efl settings. *International Journal of Language and Literature*, 5(1), 54–65. <https://doi.org/10.23887/ijll.v5i1.32598>

- Marsevani, M., & S, H. J. (2023). Translanguaging practices in language classrooms. *International Journal of Research in Education*, 3(2), 239–247. <https://doi.org/10.26877/ijre.v3i2.15911>
- May, T., & Perry, B. (2022). *Social research: issues, methods and process (5th edition)*. McGraw-Hill Education.
- Mitchell, S. A., & Walton-Fisette, J. (2022). *The essentials of teaching physical education: curriculum, instruction, and assessment (second edition)*. Human Kinetics.
- Muzaky, F., & Achadi, Muh. W. (2024). Policy analysis of the 2013 curriculum: impacts and challenges for teachers in the learning process at senior high schools. *International Journal of Post-Axial*, 2(4), 259–273. <https://doi.org/https://doi.org/10.59944/postaxial.v2i4.394>
- Nuraeni, R., Setiono, & Himatul, A. (2020). Profil kemampuan berpikir sistem siswa kelas xi sma pada materi sistem pernapasan. *Pedagogi Hayati*, 4(1), 1–9. <https://doi.org/10.31629/ph.v4i1.2123>
- Pertiwi, O. P., & Ashadi. (2024). Exploring efl students' preferences on teachers' written corrective feedback in encouraging students' writing skills. *Enrichment: Journal of Multidisciplinary Research and Development*, 2(8), 1–14. <https://doi.org/https://doi.org/10.55324/enrichment.v2i8.188>
- Purnama, S., & Pawiro, M. A. (2023). Implementation of the independent curriculum to improve the quality of learning english. *Indonesian Journal of Educational Research and Review*, 6(3), 674–688. <https://doi.org/10.23887/ijerr.v6i3.67645>
- Rizapoor, H., & Zafari, M. A. (2023). Cross-cultural learning and adaptation: enhancing madrasah management in afghanistan through insights from indonesian madrasah. *Al-Banjari: Jurnal Ilmiah Ilmu-Ilmu Keislaman*, 22(1), 106–124. <https://doi.org/10.18592/albanjari.v22i1.10875>
- Shurygin, V., Anisimova, T., Orazbekova, R., & Pronkin, N. (2023). Modern approaches to teaching future teachers of mathematics: the use of mobile applications and their impact on students' motivation and academic success in the context of STEM education. *Interactive Learning Environments*, 32(6), 1–15. <https://doi.org/10.1080/10494820.2022.2162548>
- Supriyanto, & Amrin. (2022). Management of islamic religious education learning based on cooperative problem e-learning during the covid-19 pandemic (study on Muhammadiyah High School Sukoharjo, Central Java). *Jurnal Pendidikan Dan Konseling (JPDK)*, 4(3), 30–36. <https://doi.org/https://doi.org/10.31004/jpdk.v4i3.4226>
- Susanto, N. H., Rahayani, Y., & Muasomah. (2024). Integrating rationality and mysticism in religious education: an educational perspective on islamic and indigenous java-sundanese traditions in Indonesia. *EDUKASI: Jurnal Penelitian Pendidikan Agama Dan Keagamaan*, 22(2), 184–194. <https://doi.org/10.32729/edukasi.v22i2.1472>
- Teresa, A., Febria, D., & Marsevani, M. (2024). EFL teachers' perception toward the integration of technology for ELT in the 2013 curriculum and independence curriculum. *Journal of English Education and Teaching*, 8(2), 322–336. <https://doi.org/10.33369/jeet.8.2.322-336>
- Walvoord, B. E., Stevens, D. D., & Levi, A. J. (2023). *Introduction to rubrics (2nd edition)*. Routledge. <https://doi.org/10.4324/9781003445432>
- Warman, Suryaningsi, & Mulawarman, W. G. (2021). Overcoming obstacles in implementing 2013 curriculum policy. *Cypriot Journal of Educational Sciences*, 16(3), 967–980. <https://doi.org/10.18844/cjes.v16i3.5770>
- 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. <https://doi.org/10.1016/j.tate.2024.104582>
- Yusra, K., Lestari, Y. B., & Hamid, M. O. (2022). Teacher agency and the implementation of cefr-like policies for english for tourism and hospitality: insights from local vocational high schools in Indonesia. *Current Issues in Language Planning*, 23(3), 233–253. <https://doi.org/10.1080/14664208.2021.1965739>
- Zhang, X., Chen, Y., Hu, L., & Wang, Y. (2022). The metaverse in education: definition, framework, features, potential applications, challenges, and future research topics. *Frontiers In Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1016300>