ELT-Lectura: Studies and Perspectives in English Language Teaching
Volume 13 Number 2, August 2026
ISSN (Print): 2336-8560, ISSN (ONLINE): 2550-0724

Technology Integration Challenges among Junior High School English Teachers in Riau Province: A Descriptive Study

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Abstract: This study examines the challenges faced by junior high school (SMP) English teachers in integrating technology into English language teaching in Riau Province, Indonesia. Employing a descriptive quantitative design supported by qualitative interview data, this research surveyed 96 SMP English teachers selected through purposive sampling from 12 districts and municipalities across Riau Province. Data were collected using a 64-item questionnaire, of which 19 items measured technology integration challenges. In this study, five challenge indicators were employed: teachers' preparedness, infrastructure limitations, curriculum design, students' access, and professional development. The instrument demonstrated excellent reliability (Cronbach's α = 0.917). Findings reveal that the overall challenge level was categorized as High (M = 3.47, SD = 0.85). Students' access emerged as the most critical challenge (M = 3.52), followed by teachers' preparedness (M = 3.45) and professional development (M = 3.44). Infrastructure limitations (M = 3.25) and curriculum design (M = 2.90) were categorized at medium. Demographic analysis revealed that private school teachers and urban teachers reported higher challenge scores. The study argues that these challenges are structural and systemic in nature, and require coordinated policy responses focused on equitable digital access, context-sensitive professional development, and pedagogically grounded curriculum reform. The findings contribute to the limited empirical literature on technology integration challenges in provincial Indonesian EFL contexts.

Keywords: Technology integration; EFL teachers; teacher challenges; digital competence; professional development; Riau Province

1. INTRODUCTION

The rapid advancement of digital technology has fundamentally transformed the landscape of English language teaching (ELT), positioning technology no longer as a supplementary tool but as a central infrastructure of modern educational practice. Despite this global shift, the extent to which junior high school (SMP) English teachers are able to translate these technological advances into effective classroom practice varies considerably across regions, particularly in areas outside major urban centers. In Riau Province, SMP English teachers continue to face persistent challenges in integrating technology meaningfully into their teaching, ranging from limited infrastructure and uneven access to digital tools, to insufficient training in pedagogically sound technology use. These challenges raise concerns about the

readiness of English teachers in this region to meet the demands of technology-enhanced language instruction, and they form the central problem. Thus, it evolves from a supplementary instructional tool into a central infrastructure of instruction in contexts adopting English as a Foreign Language (EFL) (Mishra & Koehler, 2006; Gonzalez-Vidal & Moore, 2024). In Indonesia, the Merdeka Belajar curriculum reform has placed digital literacy and technology-enhanced instruction at the forefront of educational policy, mandating that teachers at all levels integrate digital tools into their pedagogical practice (Mali, 2023; Lase et al., 2023). This policy mandate, however, places a disproportionate burden on junior high school (SMP) English teachers in provincial contexts such as Riau, where geographic disparities between urban centers and rural districts, uneven infrastructure, and limited access to professional training make technology integration considerably more difficult than the national policy narrative suggests. Understanding these localized challenges, rather than treating technology integration as a uniformly achievable policy goal, is essential for developing realistic, context-sensitive intervention strategies.

Despite this policy momentum, empirical evidence consistently demonstrates a persistent and often significant gap between national technology integration mandates and actual classroom practice. This gap is not primarily attributable to teacher resistance, but rather to a complex constellation of structural, institutional, and contextual barriers that constrain effective implementation (Ertmer, 2005; Hew & Brush, 2007). In the context of Riau Province, a geographically diverse region in Sumatra characterized by substantial disparities between urban centers and rural districts, these barriers take on particular salience. Research conducted in the province has identified a dichotomy between teachers' aspirations toward technology use and their apprehension regarding practical implementation (Lisia, Mahdum, & Purwanti, 2024; Ismail et al., 2023).

Existing literature on technology integration challenges in Indonesia has predominantly focused on higher education institutions or urban schools in Java. Setyaningsih et al. (2020) examined lecturers' technology adoption in university-level EFL contexts, identifying institutional support and digital literacy as key factors shaping successful integration. Mali (2023), meanwhile, explored technology-related challenges among English teachers in urban secondary schools on Java, where infrastructure and internet access were comparatively well established. Both studies offer useful insight into how technology integration unfolds in resource-rich, urban, and higher-education settings, yet neither addresses how teachers in provincial, non-Java contexts navigate similar challenges under different conditions of infrastructure, training, and institutional support.

Junior high school (SMP) English teachers in provincial settings such as Riau remain significantly underrepresented in the empirical literature. No prior study has systematically examined how this specific population perceives, adopts, or struggles with technology integration within their local socio-educational context. Given that SMP teachers in Riau work under conditions quite different from those examined in previous research, particularly in terms of infrastructure access and institutional readiness, it remains unclear whether findings from urban or university-based studies can be meaningfully applied to their situation. This study addresses that gap by focusing specifically on SMP English teachers in Riau Province.

This study addresses these gaps through a descriptive quantitative investigation of SMP English teachers' challenges in technology integration across Riau Province. Guided by Ertmer's (2005) first- and second-order barrier framework and Roblyer and

Doering's (2014) multi-dimensional challenge taxonomy, the study argues that teachers' challenges are primarily structural rather than psychological, and that effective intervention requires systemic, differentiated policy responses rather than generic technical training.

The objectives of this study are: (1) to describe the level of technology integration challenges experienced by SMP English teachers across five indicators; (2) to analyze the relative severity of each challenge indicator; and (3) to examine how challenges vary across demographic variables including gender, age, teaching experience, educational level, school type, and school location.

2. METHOD

This study employed a descriptive quantitative research design that supported by qualitative semi-structured interview data to provide contextual depth to the survey findings. A descriptive approach was selected because the primary objective was to provide an accurate, systematic portrait of teachers' challenge profiles rather than to establish causal relationships or test hypotheses (Creswell & Creswell, 2017).

The study was conducted in Riau Province, Indonesia which comprises 12 regencies and municipalities. The target population comprised Junior High School (SMP) English teachers across the province, estimated at approximately 2,000 educators based on Dapodik (2024/2025) registry data. Slovin's formula, applied with a 10% margin of error, was used only to estimate the minimum sample size required for the study given the size of the target population (Sevilla et al., 1984); it was not used to establish statistical representativeness. Within that minimum size, participants were then selected through purposive sampling. Participants were purposively selected based on the following inclusion criteria: (1) actively teaching English at the SMP level in Riau Province, (2) a minimum of one year of teaching experience, and (3) willingness to participate in both the questionnaire and, where selected, the follow-up interview. This purposive approach was intended to ensure adequate representation across school location (urban/rural), school type (public/private), and teaching experience, rather than to produce a statistically representative sample of the population. Participants were selected through purposive sampling that prioritized variation in school location, school type, and teaching experience across the province's 12 regencies and municipalities. A dedicated sentence was added stating that, because purposive sampling is a non-probability technique, the sample should not be interpreted as statistically representative of all SMP English teachers in Riau, and that it instead offers an information-rich, diagnostic snapshot of challenge patterns. The resulting sample of 96 teachers reflected diverse demographic profiles, including gender (77.1% female, 22.9% male), age groups (39.6% aged 21–30; 33.3% aged 31–40; 27.1% aged 41–50+), educational level (85.4% Bachelor's, 14.6% Master's), school type (70.8% public, 29.2% private), and school location (54.2% urban, 45.8% rural). Findings should therefore be interpreted as descriptive of this sample rather than as statistically generalizable to the full population of SMP English teachers in Riau Province.

3. FINDINGS AND DISCUSSION

3.1 Teachers' Preparedness

The Teachers' Preparedness indicator obtained an overall mean of 3.45 (SD = 0.86), categorized as High with Low Variation, indicating that teachers generally perceived readiness related challenges as significant yet manageable. It is important to note that S46 ('confident in ability to use educational technology tools') is a positively worded item measuring competence rather than difficulty, and was therefore reverse coded prior to the calculation of the Teachers' Preparedness challenge score. Under this scoring approach, a high mean on S46 (M = 3.89, SD = 1.03) reflects low perceived difficulty in this area, consistent with teachers' strong self reported confidence in operating educational technology. In contrast, S48 ('received adequate training') obtained only a Medium score (M = 2.96, SD = 1.00), suggesting that teachers perceived a moderate level of challenge related to the adequacy of the training they had received. Taken together, these findings reveal a meaningful pattern: while teachers feel capable of using technology tools at a basic operational level, they simultaneously recognize that the formal training provided to them has not been sufficient to fully support that competence. This divergence suggests that teacher confidence in Riau is likely self-developed or experience based rather than the product of structured institutional training, pointing to a gap between individual initiative and systemic support in technology readiness.

Table 1. *Descriptive Statistics of Teachers' Preparedness (S46–S49)*

Item	Statement (Summary)	Mean	SD	Interpretation
S46	Confident in ability to use educational technology tools	3.89	1.03	High
S47	Face significant obstacles integrating technology into lessons	3.23	0.96	Medium
S48	Received adequate training in using technology	2.96	1.00	Medium
S49	Need further training in technology integration areas	3.74	0.46	High
Overall	Teachers' Preparedness	3.45	0.86	High

The table above presents the descriptive statistics for the four items constituting the Teachers' Preparedness indicator. It should be noted that S46 ('confident in ability to use educational technology tools') and S48 ('received adequate training in using technology') are positively worded competence statements, in contrast to S47 ('face significant obstacles integrating technology into lessons') and S49 ('need further training in technology integration areas'), which are worded to reflect challenge or difficulty directly. Because the Teachers' Preparedness construct is measured as a challenge scale, in which higher scores are intended to indicate greater perceived difficulty, S46 and S48 were reverse coded prior to the calculation of item level interpretations and the overall indicator score shown in Table 1. Under this scoring approach, the high mean obtained for S46 (M = 3.89, SD = 1.03) reflects low perceived difficulty in using educational technology tools, consistent with teachers' strong self-reported confidence in this area. By contrast, the Medium score obtained for S48 (M

= 2.96, SD = 1.00) indicates a moderate level of perceived challenge regarding the adequacy of training received, aligning with the High score for S49, which reflects teachers' explicit recognition of the need for further training. Taken together, the pattern across S46 through S49 suggests that teachers in Riau perceive themselves as reasonably capable of using technology at an operational level, yet consistently identify formal training provision as an area of unresolved challenge.

3.2 Infrastructure Limitations

This study found that infrastructure limitations received an average score of 3.25 (SD = 1.13). This score places infrastructure limitations in the moderate category but also indicates a high degree of variation. Only this indicator has a standard deviation above 1.00.Thus, respondents' experiences with infrastructure are highly diverse. Furthermore, all items (S50–S53) have mean scores within the moderate range (M = 3.10–3.32). This finding shows that access to infrastructure is only partially available and its distribution is uneven among respondents.

Table 2. *Descriptive Statistics of Infrastructure Limitations (S50–S53)*

Item	Statement (Summary)	Mean	SD	Interpretation
S50	School provides sufficient reliable internet connectivity	3.32	1.17	Medium
S51	Enough functioning computers/tablets for student use	3.32	1.17	Medium
S52	Not concerned about quality of technology infrastructure	3.10	1.04	Medium
S53	Inconsistent access affects ability to plan tech-enhanced lessons	3.25	1.15	Medium
Overall	Infrastructure Limitations	3.25	1.13	Medium

The Medium categorization of infrastructure as a challenge may appear to suggest that facilities are adequate; however, the high standard deviation demands a more nuanced interpretation. As Batubara (2021) and Ramadhani et al. (2023) have demonstrated, the digital divide between urban and rural schools in Riau is characterized not merely by device availability but by connectivity reliability, maintenance support, and equitable distribution. A medium mean masking high variation indicates that while some teachers experience reasonably functional infrastructure, others particularly those in rural districts face conditions described vividly in interview data. Teacher B noted: 'Infrastructure challenges are overwhelming unreliable electricity, no internet connectivity, insufficient devices, outdated equipment,' while Teacher E added: 'In our rural context, technology is more of an aspiration than a reality.'

Even in urban settings, infrastructure limitations manifested differently but with comparable consequences for instruction: Teacher D reported that 'WiFi bandwidth issues arise when multiple classes stream video simultaneously.' This finding supports Gonzalez-Vidal and Moore's (2024) concept of 'technology fatigue'. It is a condition in which the expectation of technology use outpaces institutional capacity to sustain it, producing frustration and inconsistency rather than pedagogical benefit. Addressing

infrastructure challenges therefore requires geographically differentiated investment strategies rather than standardized provincial procurement approaches.

3.3 Curriculum Design

Curriculum Design indicated the lowest overall challenge mean (M = 2.90, SD = 0.82, Medium, Low Variation), suggesting that teachers perceive curriculum related barriers as relatively less severe compared to other indicators measured in this study. The most notable finding within this indicator was the divergence between S54 and the pair S55 and S57. S54 ('curriculum materials are well aligned with technology integration opportunities') is a positively worded statement, in contrast to S55 and S57, which directly describe difficulty in integrating technology into curriculum practice. Because the Curriculum Design indicator is measured as a challenge scale, in which higher scores indicate greater perceived difficulty, S54 was reverse coded prior to the calculation of its item level interpretation and its contribution to the overall indicator score. Under this scoring approach, the High score obtained for S54 (M = 3.58) reflects a low level of perceived difficulty, indicating that teachers generally regard existing curriculum materials as well suited to technology integration. This is consistent with the Low scores obtained for S55 and S57 (both M = 2.44), which fall within the lowest challenge interval and likewise indicate minimal perceived difficulty. Taken together, these three items point in the same direction: teachers do not strongly struggle with incorporating technology into lesson plans, and the curriculum itself is not perceived as a major barrier, even though this does not necessarily imply that technology has been fully embedded as an integral, rather than supplementary, component of everyday teaching practice.

Table 3. *Descriptive Statistics of Curriculum Design (S54–S57)*

Item	Statement (Summary)	Mean	SD	Interpretation
S54	Curriculum materials well-aligned with technology integration	3.58	0.56	High
S55	Challenging to incorporate technology into existing lesson plans	2.44	0.88	Low
S56	Certain subjects more suitable for technology-based learning	3.15	0.97	Medium
S57	Use strategies ensuring technology is integral to learning	2.44	0.88	Low
Overall	Curriculum Design	2.90	0.82	Medium

Table 3 presents the descriptive statistics for the four items constituting the Curriculum Design indicator. Among these, S54 ('curriculum materials are well aligned with technology integration') is positively worded, whereas S55 ('challenging to incorporate technology into existing lesson plans'), S56 ('certain subjects are more suitable for technology based learning'), and S57 ('use strategies ensuring technology is integral to learning') are worded to reflect difficulty or the need for deliberate adaptation in curriculum practice. Because the Curriculum Design indicator is measured as a challenge scale, in which higher values represent greater perceived difficulty, S54 was reverse coded before its item level interpretation was determined

and before it was incorporated into the overall indicator mean shown in Table 3. Under this scoring approach, the High score obtained for S54 (M = 3.58, SD = 0.56) reflects a low level of perceived difficulty, indicating that teachers generally view existing curriculum materials as well suited to technology integration. This finding is consistent with the Low scores obtained for S55 and S57 (both M = 2.44), which likewise indicate minimal perceived challenge in adapting lesson plans and embedding technology as an integral part of instruction. The Medium score for S56 (M = 3.15, SD = 0.97) suggests a moderate level of difficulty in determining which subjects are most suitable for technology-based learning, contributing to the overall Medium classification of the Curriculum Design indicator (M = 2.90, SD = 0.82).

Interview data further support this argument. Teacher C explained that the curriculum and assessment system remains focused on exam results, with technology used primarily to support rather than transform traditional methods. Teacher A also noted that teachers are still required to cover specific materials within a limited timeframe. These insights reveal that curriculum design challenges are part of a larger systemic tension between high-stakes assessment demands and the pedagogical flexibility required for meaningful technology integration. Ertmer (2005) classifies this ongoing tension as a second-order barrier, which is resistant to superficial intervention.

3.4 Students' Access

Students' Access was identified as the highest rated challenge indicator among all five indicators (M = 3.52, SD = 0.72, High, Low Variation), suggesting that disparities in students' access to technology remain the most pressing challenge perceived by teachers overall. The highest individual item score within this indicator appeared at S60 (M = 3.77, SD = 0.69, Very High). It is important to clarify that S60 does not measure students' access conditions directly, but rather the extent to which teachers actively respond to and attempt to address disparities in students' technology skills within their instruction. This item is included under the Students' Access indicator because it captures a pedagogical consequence of unequal access, namely the additional effort teachers must invest when students enter the classroom with uneven levels of technological competence, rather than access itself. Understood in this way, the high score on S60 does not simply confirm that access disparities exist among students, since this is already reflected in other items within the indicator, but rather indicates that teachers are highly aware of these disparities and are consistently making deliberate instructional adjustments to accommodate them. This distinction is analytically important because it shows that unequal access affects teachers not only by limiting what can be done in the classroom, but also by adding further cognitive and pedagogical demands as teachers work to compensate for gaps they did not create and cannot fully control.

Table 4. *Descriptive Statistics of Students' Access (S58–S61)*

Item	Statement (Summary)	Mean	SD	Interpretation
S58	All students have equal access to technology at school and home	3.54	0.63	High
S59	Students with limited tech access face significant learning challenges	3.55	0.58	High

S60	Teachers' efforts to address disparities in students' technology skills	3.77	0.69	Very High
S61	Students' home environments support tech use for education	3.23	0.98	Medium
Overall	Students' Access	3.52	0.72	High

The relatively lower score for S61 (M = 3.23, Medium) reveals a crucial challenge in educational equity. This indicator measures whether home environments provide support for technology-based education and demonstrates that many students do not receive adequate technological resources at home. The data suggests that the digital divide extends beyond the school environment and reaches into students' domestic situations, which results in obstacles when students face assignments or learning activities that require digital access outside school hours.

Teacher D expresses this challenge directly by stating that not all students possess smartphones, laptops, or home internet access. This condition causes ethical dilemmas for educators regarding the assignment of work that assumes technology availability after school. Teacher E also reports that student device ownership in rural districts remains very low, with 20% of students having smartphones.

These realities underscore the need for schools and policymakers to focus on equitable technology access both in and out of school. Addressing this gap ensures that technology-driven education does not worsen existing inequalities but instead supports all students fairly.

These findings are consistent with Alsaedi (2024), who demonstrated that flipped classroom and blended learning models increasingly promoted in Indonesian curriculum reform documents fail to deliver equitable learning outcomes when students lack adequate access to devices outside school. From a social justice perspective, the deployment of technology-intensive pedagogies in contexts of digital inequality has the potential to amplify existing educational disparities rather than reduce them, as highlighted by Acharya and Dhungana (2024). This study emphasizes that the issue of Students' Access constitutes the most urgent challenge and demands immediate and prioritized policy intervention because the consequences of inadequate access influence all other challenge indicators in the educational context.

3.5 Professional Development

The Professional Development indicator achieved an overall mean score of 3.44 (SD = 0.72), reflecting a high rating with low variability among responses. A closer examination of the item level scores reveals a notable divergence. Teachers reported active participation in professional development initiatives (S62: M = 3.51, High) and generally valued these experiences (S63: M = 3.77, High), yet they simultaneously indicated that the programs available to them fall short of addressing the practical challenges encountered in their classrooms (S64: M = 3.05, Medium). In this study, this pattern of high engagement and perceived value coexisting with limited practical relevance is referred to as the professional development paradox. This term is not drawn from prior literature but is proposed here as an analytical label to capture a specific condition observed in the data, namely that teachers' positive experience of professional development activities does not necessarily translate into programs that are well matched to the actual demands of their teaching context. This interpretation

is further supported by the interview data, in which several teachers described training sessions as engaging and worthwhile in general terms, while also noting that the content rarely addressed the specific technological or pedagogical difficulties they faced in their own classrooms. Taken together, the quantitative divergence across S62 through S64 and the corresponding qualitative accounts suggest that the paradox lies not in teachers' attitudes toward professional development itself, but in a mismatch between how such programs are designed and the concrete needs teachers report experiencing in practice.

Table 5. *Descriptive Statistics of Professional Development (S62–S64)*

Item	Statement (Summary)	Mean	SD	Interpretation
S62	Frequently participate in PD related to technology integration	3.51	0.50	High
S63	PD experiences beneficial for improving technology skills	3.77	0.69	High
S64	Current PD adequately addresses challenges in integrating technology	3.05	0.99	Medium
Overall	Professional Development	3.44	0.72	High

Qualitative data further reinforce the professional development paradox by highlighting a persistent disconnects between the realities of teachers' professional environments and the design of such programs. As Teacher E noted, "Workshops frequently present technology-rich scenarios predicated on access to resources that are not available in my context." Similarly, Teacher D underscored, "Training sessions frequently prioritize the introduction of new tools over the integration of those tools into pedagogical practice." These reflections align with critiques from Acharya and Dhungana (2024) and Lawless and Pellegrino (2007), who argue that broad, tool-focused professional development does not sufficiently cultivate the nuanced, context-specific technological skills educators truly require. Teacher F identified communities of practice as the most impactful avenue for professional growth, stating, "Communities of practice have constituted the most valuable professional development in which we exchange experiences of both success and failure." This sentiment echoes a growing body of research indicating that sustained, collaborative, and contextually embedded professional learning is considerably more effective than conventional, workshop-based models in equipping teachers for meaningful technology integration (Boulter, 2007; Dalal et al., 2017).

Accordingly, the primary policy implication is not simply to expand professional development quantitatively, but to fundamentally redesign such programs to emphasize contextual relevance, pedagogical sophistication, and collaborative continuity.

3.6 Overall Challenge Profile and Demographic Patterns

Table 6. *Overall Descriptive Statistics of Teachers' Challenges in Technology Integration*

Indicator	Mean	Interpretation	SD	SD Interpretation
Students Access	3.52	High	0.72	Low Variation
Teachers' Preparedness	3.45	High	0.86	Low Variation
Professional Development	3.44	High	0.72	Low Variation
Infrastructure Limitations	3.25	Medium	1.13	High Variation
Curriculum Design	2.90	Medium	0.82	Low Variation
Overall Challenges	3.47	High	0.85	Low Variation

Table 6 summarizes the overall descriptive statistics across the five challenge indicators, ranked from highest to lowest mean. Before interpreting this ranking, it is necessary to confirm that scoring direction was applied consistently across all items, given that several items within these indicators are positively worded. The overall mean score for challenges, 3.47 (High, Low Variation), indicates that integrating technology in education continues to be hindered by substantial and multi-dimensional barriers. Students' Access stands out as the most significant challenge (M = 3.52), followed by Teachers' Preparedness (M = 3.45) and Professional Development (M = 3.44). Although Infrastructure (M = 3.25) and Curriculum Design (M = 2.90) are classified as medium-level challenges, qualitative evidence demonstrates that these factors can have a particularly strong impact in rural schools, where limitations are often more severe.

Demographic analysis reveals patterns that are both theoretically and practically important. The most notable finding emerges when comparing school locations. Teachers in urban schools reported higher overall challenge scores than those in rural schools (M = 3.80, High versus M = 2.89, Medium). As no inferential statistical test was conducted to assess whether this difference is statistically significant, this pattern should be interpreted as a descriptive trend rather than a confirmed group difference. This difference should also not be interpreted as rural teachers facing fewer obstacles overall. One possible explanation, which the present study did not directly measure, is that the gap reflects what might be described as a digital divide paradox, in which rural teachers, who have less frequent access to technology, report fewer challenges simply because they have fewer opportunities to encounter them, while urban teachers, who engage with technology more often, are exposed to a broader and more frequent range of challenges. This interpretation is consistent with Ertmer's (2005) suggestion that the perception of barriers is closely tied to the level of technology engagement, although further research directly assessing frequency and intensity of technology use would be needed to confirm this explanation empirically.

Table 7. *Overall Challenges by School Location*

School Location	N	Mean	Interpretation	SD
Urban (Pekanbaru/Dumai)	52	3.85	High	0.23
Rural (Outer Districts/Remote)	44	2.89	Medium	0.22

Private school teachers reported a higher mean challenge score (M = 3.64) compared to public school teachers (M = 3.28). As no inferential statistical test was conducted to determine whether this difference is statistically significant, it is presented here as a descriptive pattern observed within the sample rather than a confirmed group difference. Several factors may help explain this pattern, although they were not directly measured in the present study. One possible explanation is that private schools tend to place stronger institutional expectations on technology enhanced learning, which may include more frequent requirements for digital assessment and more extensive use of online educational platforms compared to public schools. These institutional conditions could plausibly increase the range and frequency of challenges teachers encounter in practice, though this interpretation remains speculative in the absence of direct measures of institutional policy, assessment requirements, or platform usage frequency across school types. Future research incorporating such measures, alongside inferential comparisons supported by adequate subgroup sample sizes, would help clarify whether this pattern reflects a genuine institutional effect rather than sample specific variation.

Teachers with a Master's degree also reported greater challenges (M = 3.53) than those with a Bachelor's degree (M = 3.36). This pattern suggests that advanced academic training may encourage a more critical perspective on the complexities and equity issues involved in digital pedagogy.

In contrast, challenge scores remained relatively consistent across different gender identities, age groups, and years of teaching experience. These findings support the view that the main barriers to technology integration are structural in nature, rather than determined by individual teacher characteristics.

4. CONCLUSION

This study provides a ranked and descriptive diagnosis of the challenges related to technology integration among SMP English teachers in Riau Province, Indonesia. The results show that these challenges are real, multi-faceted, and primarily structural, with an overall challenge level classified as High (M = 3.47). The most significant barrier is students' unequal access to digital resources, which places the issue of digital equity at the forefront of any effective policy solution. In addition, challenges concerning teachers' preparedness and professional development are also prominent. However, these issues are largely due to the lack of relevance between current training programs and the realities teachers face in the classroom. This points to a systemic design problem, not a deficiency on the part of individual teachers.

The study advances three main arguments, each grounded in the descriptive patterns observed within this sample rather than in causal or statistically confirmed relationships. First, the findings suggest that challenges are shaped by context. The pattern observed between urban and rural teachers, tentatively described as a digital divide paradox, indicates that overall challenge scores may obscure meaningful differences in the specific types of barriers teachers face depending on their setting.

While this pattern should be interpreted with caution given the descriptive nature of the comparison, it points toward the potential value of tailoring interventions to the particular conditions of each region rather than applying uniform, one size fits all approaches. Second, the pattern referred to here as the professional development paradox suggests that although teachers actively participate in and value training opportunities, these programs do not consistently address the practical challenges teachers encounter in their own classrooms. This observation points toward a need for professional learning that is more closely aligned with teachers' actual instructional contexts, incorporates deeper pedagogical content rather than tool operation alone, and is sustained through ongoing, community based collaboration rather than delivered as isolated workshops.

Third, the prominence of students' access as the top challenge indicates that meaningful technology integration in Riau cannot happen without first addressing broader socioeconomic inequalities in digital infrastructure. This is a challenge that extends beyond the authority of schools and requires active involvement from provincial and national policymakers.

Based on these findings, the study offers several recommendations for educational stakeholders in Riau Province. Schools and district education offices should prioritize providing equitable access to devices and reliable internet, especially in rural areas. Curriculum developers are encouraged to include dedicated time and space for technology integration in lesson planning, ensuring this does not compromise core curriculum goals. Furthermore, professional development should shift from isolated workshops to sustained, school-based communities of practice that are responsive to teachers' actual needs and available resources. Future research should use longitudinal or intervention methods to evaluate whether these context-sensitive professional development models can effectively reduce the challenges identified in this study.

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