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ISSUES

LEVERAGING TECHNOLOGY-BASED AFL and AAL WITHIN the FRAMEWORK of ENGLISH DIFFERENTIATED INSTRUCTION in INDONESIA

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Teachers must foster within themselves the idea that technology is a part of civilization that must inevitably go hand in hand with teaching and learning, including assessment. Technology-based assessment should assist teachers in dealing with digital native students who are already aware of their own needs, requiring teachers to integrate differentiated instruction. This qualitative study reported EFL teachers' perceptions and challenges regarding technology-based assessment for learning (AfL) and assessment as learning (AaL) within the differentiated instruction framework. Gathering the data involved conducting structured interviews with 60 EFL teachers hailing from Yogyakarta, Indonesia, and utilizing the grounded theory framework as the analytical foundation. This study used content analysis. The transcribed interview data underwent coding through a systematic step-by-step process. It involved repeatedly reviewing the data to identify common patterns and recurring themes. The findings showed that EFL teachers had different perspectives about technology-based AfL and AaL within English-differentiated instruction. Most EFL teachers could be better at giving feedback after using the AfL process. They need more time to prepare technology-based AfL and AaL for differentiated instruction and group students based on their needs and abilities. Internet connectivity disrupts student engagement. Teachers mainly focus on professional development activities. The study suggests that EFL teachers and trainers should use a technology-based model for AfL and AaL to support differentiated instruction.

1. Introduction

Students today, shaped as digital natives in the digital era, need skills beyond traditional academics. The World Economic Forum (2016) outlines 16 essential skills for the 21st century, including literacy, numeracy, ICT literacy, critical thinking, collaboration, and adaptability. This study focuses on ICT literacy among these skills. Education now integrates various tools, technologies, and strategies to enhance learning across formal, informal, and lifelong learning settings. These approaches have expanded to include mobile technologies, virtual realities, collaborative learning, flipped classrooms, and more (R. Huang et al., 2019). Educational technology has a rich history spanning various tools and techniques (Spector & Ren, 2015). However, addressing obstacles to technology integration remains crucial. Despite initial

optimism, research indicates limited changes in teaching methods with technology introduction. Investigating barriers and enablers is essential (Ertmer, 2015). Educators must understand diverse student personalities to shape instructional approaches and assessments (Ertmer, 2015). The central question is whether technology can optimize teaching and learning within a differentiated framework to meet diverse student needs in the digital age. Teachers are often advised to differentiate instruction to meet the needs of culturally and linguistically diverse classrooms (Baecher et al., 2012). However, clarity is needed on what differentiated instruction entails and how it can be integrated into teaching routines and procedures (Baecher et al., 2012; Peters et al., 2022; Smets et al., 2022; Sun, 2023). This phenomenon leaves teachers with questions such as whether they should develop different lesson plans daily, how to manage a classroom with diverse activities, and how to conduct assessments within varied lesson plans (Baecher et al., 2012).

This study focused on technology-based Assessment for Learning (AfL) and Assessment as Learning (AaL) within the framework of differentiated English instruction. Technology facilitates interactive lessons and assessments using students' devices, enabling real-time interaction and feedback for teachers (Rad & Alipour, 2024). Assessment literacy is crucial for teachers, with AfL, AaL, and Assessment of Learning (AoL) as interconnected units shaping the learning process (van der Vleuten et al., 2017). While historically teachers have been primarily responsible for AoL, the integration of AaL and AfL has influenced the AoL process. Yan (2021) suggests on-site support enhances teachers' implementation of AaL and AfL, aligning with AfL principles of collecting timely information for targeted feedback (Panadero et al., 2018; Wu et al., 2021). The characteristic of AfL concerning assessment then learning (Yan & Boud, 2022) supports teachers in applying diagnostic assessment within differentiated instructions.

Furthermore, according to Broadfoot et al. (1999), Crooks (2011), Earl (2003), and Earl (2014), AaL entails assigning students an active role in self-assessment and self-directed learning to optimize the learning process. In this view, students are active assessors, fostering metacognitive and self-regulated learning skills (Lam, 2016). Some scholars argue that AaL should be considered a subcategory of AfL (Clark, 2012; L. M. Earl, 2014; Lam, 2018). Despite ongoing discussions about teachers' understanding of AfL and AaL due to their similarities, previous research suggests a need to explore AaL further in the EFL teaching context in Indonesia, balancing AfL and AoL (Yan & Boud, 2022). Historically, teachers have primarily handled AoL through technology, with its implementation contingent on considering AaL and AfL. The integration of AaL and AfL influences the AoL process. Educators commonly face challenges incorporating AaL and AfL in differentiated instruction through technology. Hence, this study aims to explore teachers' perceptions and challenges of technology-based AfL and AaL within the framework of differentiated instruction.

2. Literature review

2.1. Differentiated instruction

Differentiated instruction revolutionizes the traditional classroom paradigm by acknowledging and embracing students' diverse learning needs and styles. Unlike classrooms with minimal differentiation, which often overlook individual differences, a differentiated classroom actively leverages both commonalities and distinctions among students. By offering various pathways to acquiring knowledge, understanding concepts, and demonstrating learning, differentiation ensures that each student can engage effectively with the material (Baecher et al., 2012; Tomlinson, 2017; Tomlinson et al., 2015; Yuen et al., 2022).

This approach, as emphasized by Tomlinson (2017), does not entail separate assignments for each learner but rather promotes meaningful learning experiences where all students actively participate in mastering essential concepts. Moreover, differentiation operates within a holistic framework, akin to a one-room schoolhouse, where the teacher addresses the class as a whole, facilitates small group work, and attends to individual needs as necessary. Crucially, differentiation is not solely about accommodating learning styles or preferences but involves adaptive teaching, wherein educators consider students' readiness, interests, and learning profiles to tailor instruction purposefully across content, process, product, and environment, as outlined by Tomlinson (2001) and supported by recent research (Langelan et al., 2024; Yuen et al., 2022). Thus, differentiation serves as a dynamic and inclusive approach that fosters both academic growth and a sense of community within the classroom.

2.2. Assessment for learning (AfL)

Assessment for learning (AfL) serves as a cornerstone in the educational landscape, empowering teachers to finely calibrate their instructional practices to meet the diverse needs of their students. By meticulously crafting assessments that illuminate both individual learning styles and overarching patterns, teachers gain invaluable insights into student knowledge application. Leveraging this information, educators can precisely tailor their teaching strategies, resources, and feedback mechanisms to propel student learning forward (Wu et al., 2021). Indeed, AfL embodies a multifaceted approach, integrating real-time data collection, targeted feedback delivery, and the cultivation of robust learning goals (Dochy et al., 2022; Hong, 2023; J. Huang et al., 2023; Mohammadi et al., 2023; Yang et al., 2023). As underscored by various scholars (Black & Wiliam, 1998; L. Earl & Katz, 2006; Heritage, 2016; Sadler, 1989), the essence of AfL lies in educators' pedagogical engagement, steering students towards academic achievement and fostering their autonomy in the learning process.

Moreover, the symbiotic relationship between AfL and differentiated instruction becomes evident. As revealed by Earl and Katz (2006), AfL furnishes teachers with a detailed map of students' existing competencies, enabling them to chart the most suitable trajectory for instruction. Prioritizing AfL ensures that educators continuously align curriculum expectations with individual student progressions, facilitating targeted interventions and personalized support mechanisms. Through this detailed approach, teachers effectively mitigate confusion and frustration, paving the way for seamless learning experiences. By embracing AfL as a guiding principle, educators can unlock the full potential of differentiated instruction, ushering students towards academic success with precision and purpose.

2.3. Assessment as learning (AaL)

The value of AaL has been recognized for promoting student learning (Boud & Falchikov, 2007; Brown, 2013). The self-assessment process is also particularly effective in promoting the concept of assessment as learning (AaL). The fundamentals for self-assessment are based on purposeful learning principles; then, the strategies in which learners attempt to make meaning of their experiences are analyzed so that recommendations for organizational function for learner involvement can be appointed much further. It has also been claimed that engaging children in self-assessment could benefit their intimate and intellectual development. Thus, self-assessment is a component of the educational process rather than a means of providing formative assessment substantiation (Dann, 2003; Lam, 2020).

The principles and practices are conceptually related to the learners' self-regulatory role in learning. Any assessment concept will be weakened if the many complex ways learners understand, interpret, and make sense of their surroundings are acknowledged. Although there are no guarantees that outcomes incorporating self-assessment will provide more than a glimpse of learners' understanding and achievement, they can provide opportunities for learners to think, learn, and judge in ways that can be developed continuously throughout schooling and beyond. Yan and Yang (2021) stated that AaL is a learning strategy, rather than an assessment method, that requires students to learn from engagement with the assessment task and associated activities. AaL's task is to generate learning opportunities for students beyond recalling and using their prior knowledge and foster the development of metacognition and self-regulation for students to monitor their performance and cater to their ongoing learning needs.

2.4. Technology-based AfL and AaL

Technology-based assessments focus on leveraging technology for creating learning products, enhancing technology skills, and assessing learners' strengths and challenges in classroom activities (Salend, 2009; Chappuis, 2008; Kapsalis et al., 2020). These assessments, whether traditional or

technology-based, can connect instruction to formative and summative assessments, making them suitable for AfL and AaL. It is crucial that technology supports teaching, learning, and assessment processes without altering classroom-based instruction (Salend, 2009; Wolf & Lopez, 2022).

Teachers must consider various factors when integrating technology for AfL and AaL in EFL teaching-learning activities: (1) ensuring that the technology enables the measurement of meaningful language skills and instructional outcomes; (2) ensuring the appropriateness of the technology for students' ages, developmental stages, academic levels, etc.; (3) ensuring that the technology accommodates students' differences, such as disabilities and cultural backgrounds; (4) utilizing technology to plan, deliver, evaluate, and revise instructional programs; and (5) utilizing technology to share relevant information with professionals and students' families (Salend, 2009). Based on the issues mentioned previously, the current study sought to answer the following research questions.

1. What are Indonesian EFL teachers' perceptions of implementing technology-based AfL and AaL within the differentiated instruction framework?
2. What are Indonesian EFL teachers' challenges in implementing technology-based AfL and AaL within the differentiated instruction framework?

3. Methodology

3.1. Design of the study

The study employed qualitative methods to explore teachers' perceptions and challenges of technology-based AfL and AaL in EFL within differentiated instruction. Semi-structured interviews were conducted to gather insights into teachers' perspectives and challenges in integrating technology-based AfL and AaL. Content analysis with coding was employed, following the grounded theory framework proposed by Glaser (1967), ensuring data validity and reliability (Ahmadi & Sheykholmoluki, 2023; Saldaña, 2021). Two experts, one in educational technology and the other in English language assessment, assessed the content reliability and validity of interview questions, spending a week evaluating each question's applicability, precision, and language suitability.

3.2. Participants and research setting

The data for this study were acquired from 60 EFL teachers from Indonesia who volunteered to participate. They delivered English lectures at colleges, schools, and language institutes around Indonesia. They specialized in English language instruction, applied linguistics, and literature studies. Before

Table 1. EFL teachers' demographic information in Indonesia

Demographic information	Number (%)
Age	
22-26	15 (25%)
26-30	11 (18%)
31-35	18 (30%)
35 <	16 (27%)
Gender	
Male	24 (40%)
Female	36 (60%)
University degree	
BA	27 (45%)
M.Ed or MA	21 (35%)
PhD	12 (20%)
Field of study	
English language education	33 (55%)
Applied linguistics	12 (20%)
English literature	15 (25%)

beginning the study, the researchers described its goal. As stated in the following table, they assured the participants that their identities, responses, and personally-identifying information would be maintained undercover.

3.3. Instruments

The researchers conducted voice semi-structured interviews in two parts. The first segment focused on participants' settings and the second part included eight questions about teachers' views on and obstacles in integrating technology-based AfL and AaL. Sixty EFL teachers were approached for 30- to 60-minute interviews. Respondents clarified their perspectives on various aspects of technology-based AfL within differentiated instruction.

1. Are you identifying particular learning needs of students or groups by applying assessment for learning (AfL) (like diagnostic or formative assessment)? Please explain.

2. Are you selecting and adapting materials and resources to your students based on AfL you have conducted? Please explain.

3. Are you creating differentiated teaching strategies and learning after considering the result of AfL? Please explain.

4. Do you have any opportunities for helping individual students move forward in their learning? Please explain.

5. Do you provide immediate feedback and direction to students? Please explain.

6. Do you encourage and promote students' self-reflection, metacognition, and self-monitoring of their learning and progress?
7. Have you ever integrated any technology like LMS or AI in numbers 1-5? Please explain.
8. What are the challenges based on your experiences when conducting the activities related to questions 1-7?

3.4. Data collection procedure

The data-gathering strategy for this study involved conducting semi-structured interviews with 60 EFL teachers in Indonesia. Each interview was extensively documented through audio recording and subsequent transcription during non-instructional time. Saldaña (2021) used content analysis and Glaser's grounded theory framework (1967) to analyze transcribed materials, identifying patterns and themes. Recorded interview data was codified using an iterative inductive technique through content analysis, involving systematic revisitation to identify common patterns and recurring themes within the dataset.

3.5. Data analysis

The findings underwent qualitative analysis aligned with the research design. Specifically, content analysis was applied to the interview, and transcribed data were systematically coded using an iterative inductive methodology with recurrent revisitation. Techniques outlined by Saldaña (2021) and Ahmadi and Sheykholmoluki (2023) were followed for coding and quantification. Fundamental themes were identified, frequencies recorded, and results organized in tabular form.

4. Results

Six phases were utilized to extract themes from interviews with teachers. According to Ahmadi and Sheykholmoluki (2023) and Saldaña (2021), data processing included transcribing, sorting, initial coding, second-level coding, template coding, and developing concepts and themes. These stages led to the classification of specific topics.

4.1. RQ1 finding: EFL teachers' perceptions regarding technology-based AfL and AaL within the framework of differentiated instruction

EFL teachers' perceptions of technology-based language AfL and AaL in the context of differentiated instruction were explored using eight interview questions and examined using the concept of technology-based assessment from Salend (2009), assessment for learning from Heritage (2018), assessment as learning from Yan and Yang (2021), Schellekens et al. (2021), and

differentiated instruction from Tomlinson (2017). The questions assessed the participants' understanding of technology-based AfL and AaL within the differentiated teaching framework.

4.I.I. EFL TEACHERS' PERCEPTIONS REGARDING AFL WITHIN THE FRAMEWORK OF DIFFERENTIATED INSTRUCTION

Teachers were questioned about implementing AfL within the framework of differentiated instruction. Figure 1 shows the acquired results.

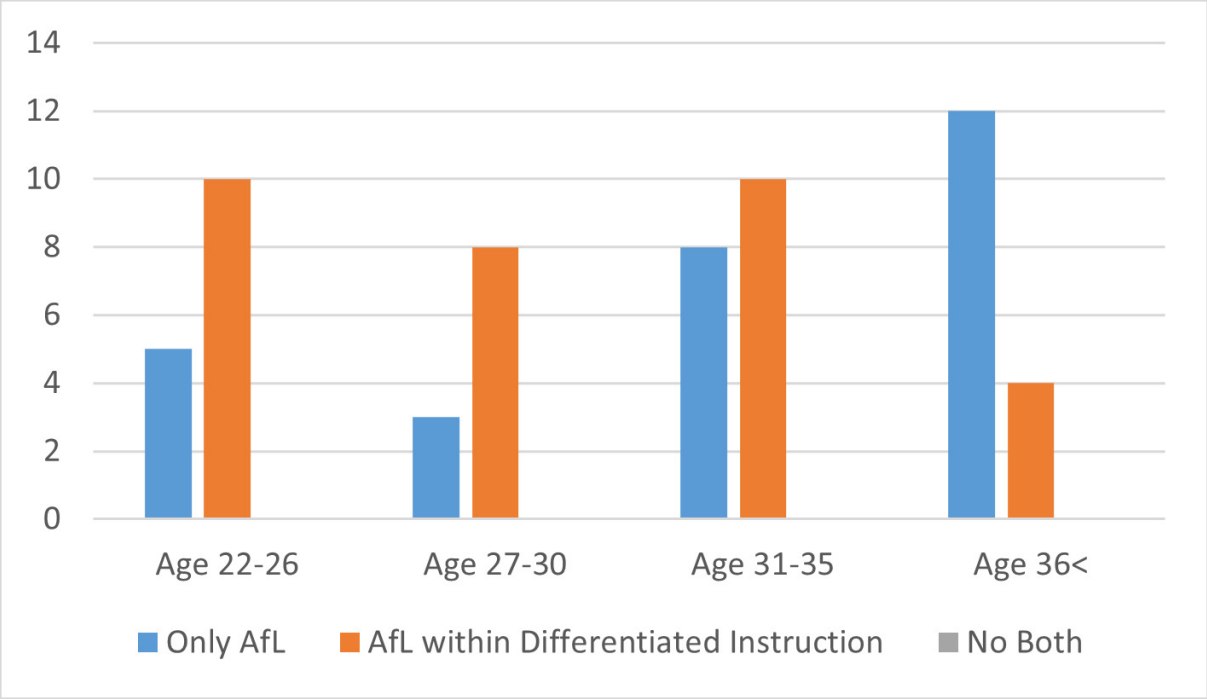


Figure 1. EFL teachers' perceptions regarding the implementation of AfL within the framework of differentiated instruction

Figure 1 shows that 32 EFL teachers (53%) implemented AfL within differentiated instruction, while 28 EFL teachers (47%) implemented AfL without following the differentiated instruction framework. Most teachers demonstrate that they have integrated AfL into a differentiated instruction framework, particularly among those aged 22 to 35. Teachers from this age group noted that:

> I usually conduct diagnostic assessments during the initial class meeting to gauge students' prior knowledge, characteristics, English skills, critical thinking, and attitudes toward the subject and learning process. AfL may manifest as question-answer activities, simple quizzes, or opinion sharing in class. The students' responses and behavior during these activities provide insights into their learning needs. (Teacher 45, Interview question 1)

However, Teacher 21 (40 years old), Teacher 5 (36 years old), and Teacher 15 (38 years old) stated that they found issues with it:

> I implemented AfL but identified challenges due to students' differing abilities and a large class size, indicating potential for more optimal feedback provision. (Teacher 21, Interview questions 1 & 4)

> I applied AfL through diagnostic assessment but faced difficulty optimizing differentiated instruction due to time constraints. The teacher highlighted the need to accommodate diverse student needs, including different learning materials, strategies, and methods (Teacher 5, Interview questions 1, 2, & 3).

> I experienced challenges in providing optimal feedback on students' writing skills due to time constraints in reviewing each student in a large class, despite the willingness to offer feedback. (Teacher 15, Interview questions 1 & 4)

The findings indicate that EFL teachers aged over 35 face significant challenges when integrating AfL and AaL within the framework of differentiated instruction. It is not a lack of understanding of AfL and AaL that overwhelms them but rather the perceived inability to provide optimal feedback and group students effectively based on their needs and abilities. This challenge stems from time constraints, including the preparation of teaching materials, activities, and assessments tailored to differentiated instruction. Often, the effectiveness of innovative teaching practices is attributed solely to the need for enhanced teacher knowledge, beliefs, and skills, leading to calls for extensive professional development. However, this approach overlooks the complex realities teachers face, including competing priorities and limited resources. Consequently, teachers evaluate instructional changes based on practicality, prioritizing goals that align with classroom demands and constraints (Janssen et al., 2015; Kennedy, 2010; Westbroek et al., 2020). It is crucial to recognize and address these systemic challenges to support teachers in implementing effective differentiated instruction strategies.

4.I.2. EFL TEACHERS' PERCEPTIONS REGARDING AAL WITHIN THE FRAMEWORK OF DIFFERENTIATED INSTRUCTION

Teachers were mainly questioned about implementing AaL within the framework of differentiated instruction. As revealed in Figure 2, 20 EFL teachers (33%) were implementing AaL within differentiated instruction, 15 EFL teachers (25%) were only implementing AaL without following the differentiated instruction framework, and 25 EFL teachers were not implementing AaL or differentiated instruction.

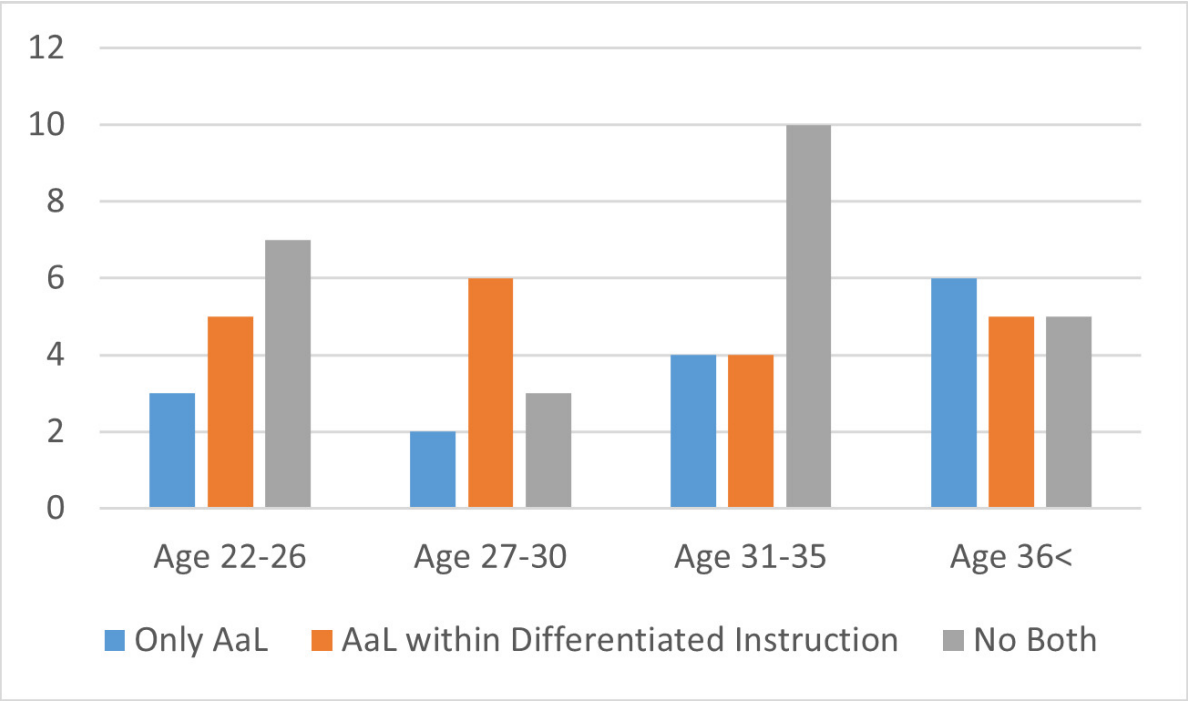


Figure 2. EFL teachers' perceptions regarding the implementation of AaL within the framework of differentiated instruction

The shared personal experience highlights the interconnection between AfL and AaL in fostering student growth and development. Thoughtful implementation of AfL strategies, coupled with tailored activities and active student engagement, can facilitate effective AaL journeys and enhance critical thinking skills. However, the complex nature of AfL, requiring individualized feedback and creative approaches, may present challenges in fully achieving AaL objectives. Nevertheless, AaL remains a viable pathway for students, particularly those with strong critical thinking abilities, even when AfL outcomes differ from expectations. As a teacher, it is essential to prioritize both AfL and AaL, even amidst evolving instructional approaches like differentiation. This ensures that students are empowered to take ownership of their learning experiences and outcomes (Teacher 20, Interview question 6).

This response revealed that the success of AaL happened if AfL occurs throughout the learning process, teachers align instructions with the targeted outcomes, identify particular learning needs of students or groups, select and adapt materials and resources based on student's learning needs, create differentiated instruction and learning opportunities for helping individual students move forward in their learning and provide immediate feedback and directions to students. Differentiation instruction is generally tailored to specific subgroups of students rather than the whole class and involves the teacher in creating variations of the main activities of the lesson. It also provides the opportunity to focus more on language development activities within the content lesson (Baecher et al., 2015; Tomlinson, 2017).

4.I.3. EFL TEACHERS' PERCEPTIONS REGARDING TECHNOLOGY-BASED AFL AND AAL WITHIN THE FRAMEWORK OF DIFFERENTIATED INSTRUCTION

Teachers were interviewed about incorporating technology into implementing AfL and AaL within the differentiated instruction framework. The obtained results are summarized in Figure 3: 34 EFL teachers (57%) were implementing technology-based AfL within differentiated instruction, 2 EFL teachers (3%) were implementing technology-based AaL within differentiated instruction, 2 EFL teachers (3%) were implementing technology-based AfL and AaL within the framework of differentiated instruction, and 22 EFL teachers (37% were not implementing technology-based AfL and AaL within the framework of differentiated instruction.

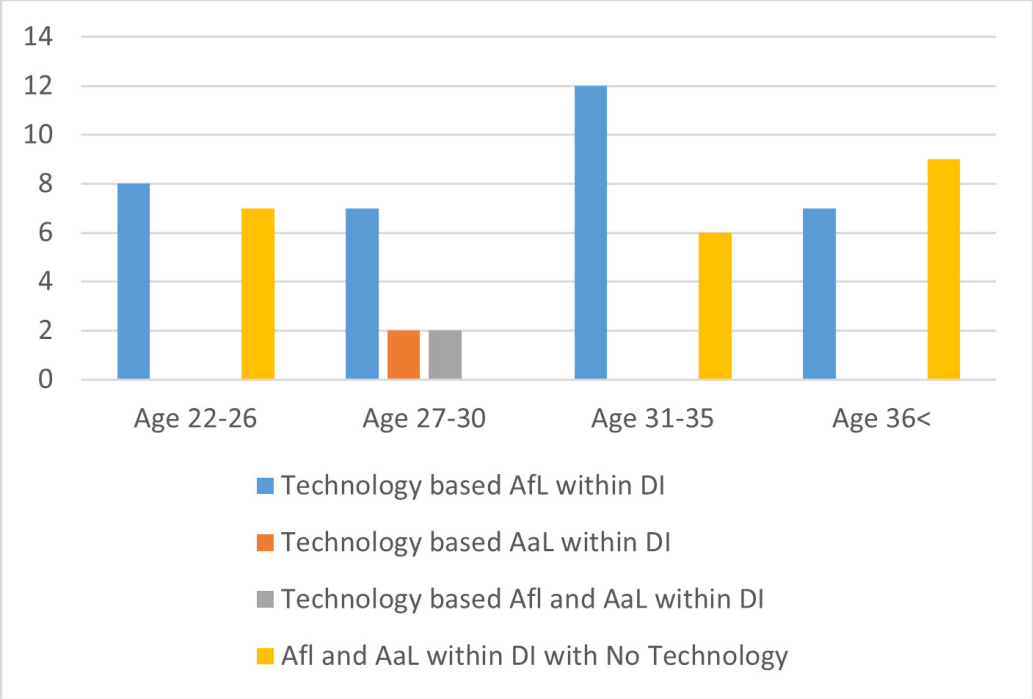


Figure 3. Teachers' perception regarding incorporating technology into the implementation of AfL and AaL within the framework of differentiated instruction

As demonstrated in Figure 3, most teachers expressed that they already know the fundamentals of technology within the framework of differentiated instruction, as one of the teachers stated in the following statements.

> I have a solid understanding of technology-based AfL, recognizing its alignment with students' learning objectives and assessment criteria. The teacher noted students' enthusiasm for integrating technology into teaching and assessment. For the first class meeting, technology was utilized to conduct a diagnostic assessment as part of AfL, employing platforms such

> as Quizizz, Nearpod, Moodle, Google Classroom, Padlet, Wakelet, and AI tools like Elsa and Orai. (Teacher 2, Interview question 1)

This response encapsulates Salend's theory (2009), suggesting that assessment techniques and technology facilitate comprehensive assessment of language skills and instructional outcomes. Another study highlighted by Danniels et al. (2020) emphasized the potential of technology integration in education for improved engagement in teaching, learning, and assessment methodologies. Among 34 EFL teachers (57%) who participated, one stated:

> Employing technologies such as Kahoot or other platforms, including Learning Management Systems (LMS) or artificial intelligence, significantly simplifies the process. This entails assessing students' proficiency levels through diagnostic assessments before commencing instructional activities. Nevertheless, challenges may arise, particularly in unstable internet connections. (Teacher 40 & interview question 1)

This response aligns with findings from Dridi et al. (2020), indicating that internet disruptions negatively affected student engagement. Students showed reduced confidence due to delayed feedback amid connectivity issues. Teachers required assistance in assessing students' needs and challenges. Despite intermittent connectivity, the collaborative learning environment was crucial for helping students navigate technological challenges.

4.2. RQ2 finding: EFL teachers' challenges regarding technology-based AfL and AaL within the framework of differentiated instruction

EFL teachers' difficulties with technology-based AfL and AaL within differentiated instruction were explored using eight interview questions. The analysis combined theories from Salend (2009), Heritage (2018), Yan and Yang (2021), insights from Schellekens et al. (2021), and principles of differentiated instruction from Tomlinson (2017). These questions aimed to understand participants' grasp of technology-based AfL and AaL within differentiated instruction.

4.2.I. EFL TEACHERS' CHALLENGES REGARDING THE UNDERSTANDING OF IMPLEMENTING TECHNOLOGY-BASED AFL AND AAL WITHIN THE FRAMEWORK OF DIFFERENTIATED INSTRUCTION

Teachers were interviewed about their challenges in implementing technology-based AfL and AaL within the differentiated instruction framework.

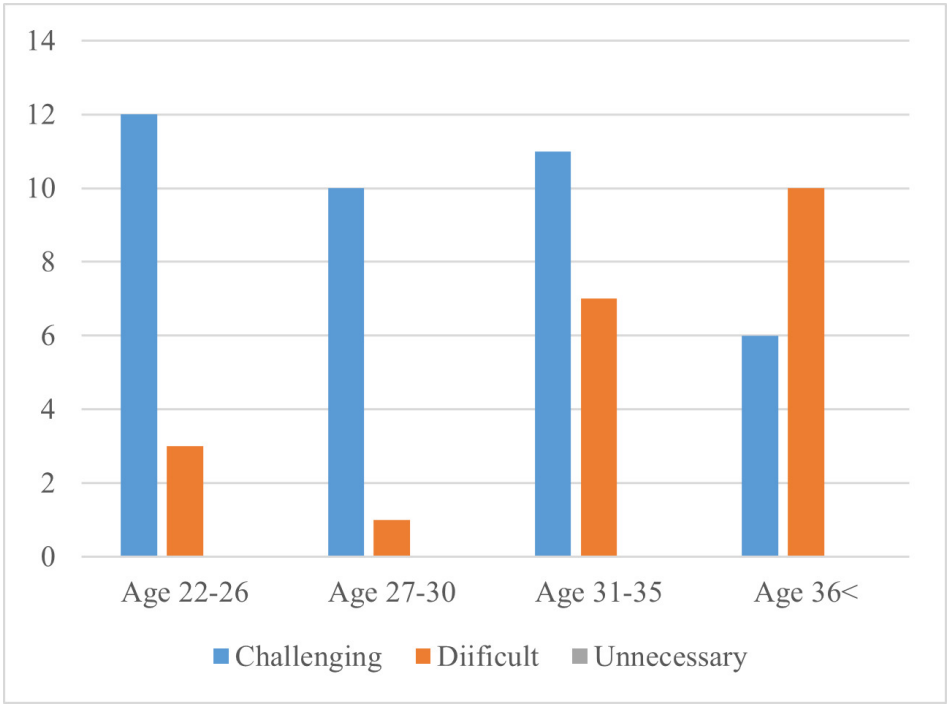


Figure 4. EFL teachers' challenges regarding the understanding of implementing technology-based AfL and AaL within the framework of differentiated instruction

Figure 4 shows that 39 EFL teachers (65%) face challenges adapting to new methodologies. Despite technology's prevalence in education, integrating it into assessments is relatively new. However, 21 EFL teachers (35%) struggle with this integration due to concerns about technological literacy and consistent internet access across regions in Indonesia. These challenges hinder the widespread implementation of AfL, AaL, and AoL as required by the differentiated instruction framework. In response, some EFL teachers expressed:

> Implementing differentiated instruction is more feasible with larger class sizes, allowing for tailored group organization based on individual needs and cognitive characteristics, yet it presents personal challenges and requires significant effort. The need arises to design diverse instructional materials meticulously and employ varied methods and strategies to ensure the effectiveness of differentiated instruction. (Teacher 27, Interview question 3)

> Technology-based AfL and AaL reflect societal changes and signify educational restructuring towards a learning-centric society. Successful implementation relies on teachers' proficiency in technology fundamentals and understanding of effective assessment methods through technology. Government efforts are crucial for widespread literacy in these changes, but obstacles such as incomplete socialization hinder technology integration, including AfL, AaL, and AoL, within the

> "Merdeka Belajar" curriculum in Indonesia, internet connectivity issues adding complexity to the situation. (Teacher 8, Interview question 3)

This response emphasizes the importance of understanding AfL and AaL concepts. Such comprehension is crucial for constructive alignment and refining assessment strategies, impacting teachers' perspectives on teaching, learning, and instruction (Schellekens et al., 2021). On the other hand, aligning assessment practices with national and educational regulations while considering classroom realities showed coherence. There was alignment between national policy and classroom procedures, but inconsistencies arose between school and classroom policies. This indicates a gap between curriculum-defined assessment practices and their implementation in classrooms. Another teacher expressed this viewpoint:

> I harbor uncertainties about whether technology-based AfL and AaL effectively cater to students' differences, especially when educators don't incorporate these processes before engaging in AoL. Teachers must implement AfL to understand students' characteristics, needs, and progress accurately. Failing to employ diagnostic assessments at the onset of instruction makes it arduous for teachers to discern ongoing needs and diverse student characteristics in advance. Consequently, preparing materials tailored to varying student needs becomes challenging, leading to a scenario where teachers adhere strictly to the existing curriculum rather than adapting to their students' realities. (Teacher 14, Interview question 4)

This response elaborates on Salend's (2009) theory, highlighting the pivotal role of assessment techniques and technology in facilitating differentiated instruction to cater to students' diverse needs across various dimensions such as disability, cultural background, and socioeconomic status. Salend (2009) underscores the importance of considering a wide range of student attributes, including age, developmental stage, academic proficiency, cognitive ability, language proficiency, social skills, behavioral tendencies, and technological literacy, in the selection of assessment methods and technology. The overarching objective is to ensure that assessment practices align closely with individual student needs and capabilities, thereby fostering an inclusive and personalized learning environment that respects the unique characteristics of each learner. This perspective resonates with Schellekens et al.'s (2021) study, which characterizes educational assessment as the adept teacher's ability to adapt teaching and learning dynamically to accommodate students' diverse pedagogical preferences. Within this framework, teachers engage students at their current level of understanding, guiding them towards further progress based on their current achievements. The diverse array of assessment practices

employed by teachers encompasses efficient and innovative teaching methods, continuous monitoring, scaffolded activities, and differentiation strategies, all aimed at effectively addressing the multifaceted needs of students.

4.2.2. EFL TEACHERS' CHALLENGES REGARDING TEACHER PROFESSIONAL DEVELOPMENT

Figure 5 depicts several teachers' viewpoints of the challenges they faced while employing technology-based AfL and AaL within the framework of differentiated instruction.

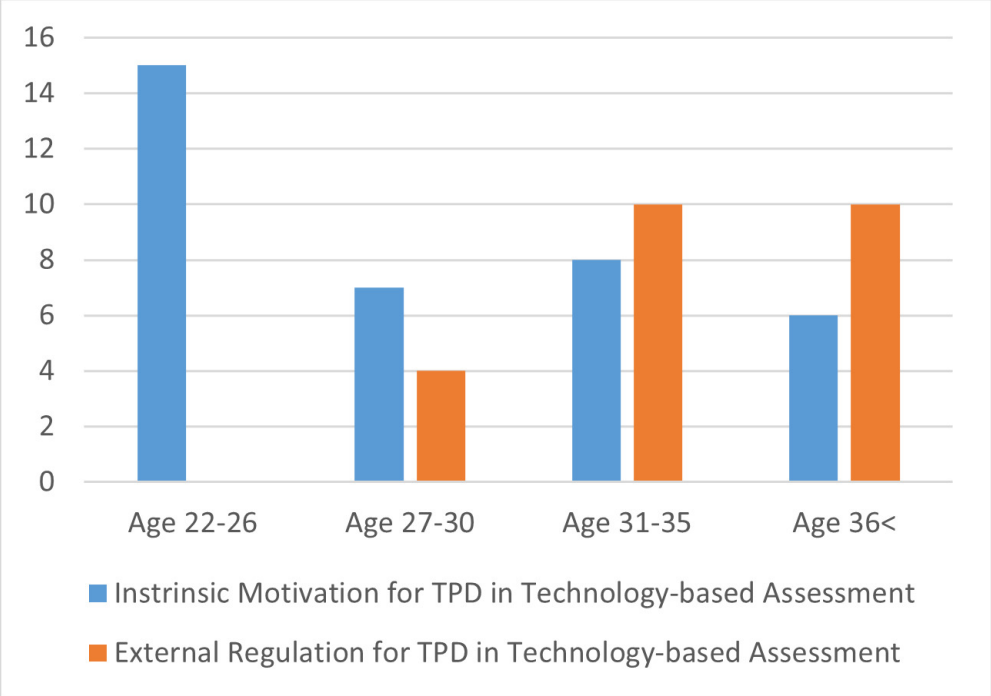


Figure 5. EFL teachers' challenges regarding teachers' professional development (TPD)

Figure 5 revealed that two kinds of teachers have the factor of joining professional development, especially when learning technology-based assessment within the framework of differentiated instruction; 36 EFL teachers (60%) have their intrinsic motivation of TPD, and 24 EFL teachers (49%0 have external regulation of TPD—the results related with the interview of some EFL teachers.

> Comprehending technology-based AfL, AaL, and AoL is very useful, along with consulting and sharing ideas with experienced colleagues, which improves knowledge and practice in this new assessment approach. Although it's part of the new curriculum "Merdeka Belajar" and represents differentiated instruction, as educators, learning it becomes a necessity to support career performance and fulfill the mandate of being a teacher. (Teacher 36, Interview questions 4 & 6)

> In my personal experience, time limits, large class sizes, lack of proper training on applying technology-based AfL and AaL, an exam-oriented culture, and biases in some technology-based assessment practices like self and peer assessment have overwhelmed me, especially when conducting differentiated instruction, which requires extensive preparation. (Teacher 33, Interview questions 4 & 8)

The findings indicate that teachers actively engage in professional development through discussions with experts or colleagues, attending workshops, seminars, webinars, and conferences, and reading relevant articles and books on technology-based language assessment. These activities are pursued not only out of obligation or work demands but also out of a genuine desire for knowledge. Basikin (2020) highlights how professional development programs can shift motivation from extrinsic to intrinsic, provided internalization occurs. Similarly, as noted by Schellekens et al. (2021), such programs contribute to teachers' perspectives on teaching, learning, and instruction by fostering local assessment practice communities.

5. Discussion

The study revealed diverse perceptions among EFL teachers in Indonesia regarding technology-based AfL and AaL within differentiated instruction. These approaches are advocated under the new curriculum, necessitating comprehensive support from policymakers to ensure proficiency among teachers, students, and stakeholders. EFL teachers view technology-based AfL and AaL as procedural, constructive, introspective, solution-oriented, and learning-focused evaluation techniques prioritizing input and growth over outcomes. These findings align with prior research (Alwan et al., 2007; Jones & Saville, 2016; Wolf & Lopez, 2022), which underscores technology-based AfL and AaL as assessment methods emphasizing constructive criticism and learning to enhance assessment and instruction by emphasizing process over product in evaluating student achievement.

Teachers' commitment to embracing core educational concepts, including AfL and AaL within differentiated instruction, alongside the fundamental principles of technology use, underscores their role as lifelong learners. They demonstrate a strong inclination towards professional growth through engagement in education courses, literature review, and participation in assessment-related events. Their endorsement of technology-based AfL and AaL for enhancing comprehension reflects their evaluation literacy and proactive approach to professional development (Basikin, 2020; Hooper, 2022; Kahmann et al., 2022). Moreover, their thorough understanding of these concepts and practices is influenced by factors such as self-efficacy, shaped by firsthand knowledge and experiences (Abbitt, 2014; Gurvitch & Metzler, 2009; Peebles & Mendaglio, 2014; Tafazoli, 2022; Wang et al., 2014). Self-efficacy, as highlighted by Bandura (2006) and others, correlates with

individuals' perceptions of their ability to achieve goals (Christophersen et al., 2015; Dai, 2023; Hatlevik & Hatlevik, 2018). Despite facing various challenges, including changes in the curriculum, Indonesian EFL teachers demonstrate resilience and adaptability, driven by a strong desire to meet students' evolving needs and master challenges as they arise. This resilience underscores their high level of self-efficacy and commitment to their profession, enabling them to overcome obstacles and maintain enthusiasm in the face of adversity.

The study highlighted the challenges faced by EFL teachers in integrating technology-based AfL and AaL within the framework of differentiated instruction. Challenges include curriculum-technology mismatch, minimal comprehension of differentiated instruction, and feelings of overwhelm and time constraints (Grecu, 2023). To address these challenges, teachers must customize content, process, and product elements, employing varied methodologies to cater to diverse student needs while aligning with learning objectives. These strategies, advocated by scholars like Lim and Park (2022) and Tomlinson (2017), ensure comprehensive support for both class-wide and individual student progress. Furthermore, enhancing technology literacy among EFL teachers is crucial, necessitating regular training sessions and workshops on digital literacy. Collaboration with tech companies for on-campus support services, assistance with device and connectivity issues, and initiatives to provide affordable access to necessary devices and internet connectivity are vital steps in empowering teachers and students to leverage technology effectively (Lim & Park, 2022; Tomlinson, 2017).

Furthermore, issues like internet connectivity and technological barriers require a multi-faceted approach that involves infrastructure improvements, policy changes, and the implementation of innovative solutions. Some practical solutions should be considered to overcome the issues: collaborate with local internet service providers and government agencies to improve and expand broadband infrastructure around the educational setting, ensure comprehensive and reliable Wi-Fi coverage across the entire school environment, negotiate with internet service providers to offer discounted or subsidized internet plans for students and faculty members, choose or develop learning management systems (LMS) and educational platforms that are optimized for low-bandwidth environments, enable offline access to course materials and lectures, allowing students to download content, teachers' feedback or upload assignments, when they have internet access and view it later without a connection.

6. Conclusion

Educators must assess the efficiency, effectiveness, fairness, and acceptability of technology-based Assessment for Learning (AfL) and Assessment as Learning (AaL) within differentiated instruction, incorporating teachers' perspectives (Schellekens et al., 2021). Reflection on challenges and their

impact on teaching practices is essential for monitoring, supporting, and communicating student learning effectively. Teachers should evaluate the resources, time, and preparation needed for successful implementation. Students' input is valuable in identifying effective practices and suggesting improvements for technology-based assessment (Schellekens et al., 2021). This collaborative approach ensures that technology-based assessment supports effective teaching and learning. Integrating technology-based AfL and AaL in differentiated instruction enables EFL teachers to understand and accommodate students' diverse needs (Tomlinson, 2017). It emphasizes the importance of a flexible teaching approach rooted in an inclusive environment, assessment to inform instruction, and adaptable classroom management.

Employing technology-based alternatives for AfL and AaL within the differentiated instruction framework offered benefits for both students and teachers. Students can acquire a range of skills simultaneously, including educational, interpersonal, professional, practical, and technological skills (Alwan et al., 2007; Wolf & Lopez, 2022). Teachers can utilize these practices to monitor students' learning achievements and inform instructional decisions. Gradually integrating these practices helps bridge the technology gap, fosters digital proficiency among students, safeguards their work, and keeps teachers updated on new technologies and assessment strategies. Furthermore, teachers should carefully evaluate various technologies to identify the most effective, equitable, and suitable options for teaching, learning, and assessments. It is essential for teachers to assess how well technology-based assessment practices align with their educational program and curriculum content objectives.

The research faced limitations including a small sample size, brief observation periods, and limited diversity among participants, along with a lack of quantitative data and input from government officials or policymakers. Future studies should explore government perspectives comprehensively. Nonetheless, the findings offer valuable insights and implications for further research. It is important to consider EFL teachers' self-efficacy regarding technology-based AfL and AaL within differentiated instruction, focusing on process, social modeling, psychological modeling, and product orientation. Standard guidelines for technology-based AfL and AaL implementation are essential. Developing an instructional model that accommodates student differences and addresses their needs within the differentiated instruction framework is highly recommended.

AfL and AaL can be effectively implemented in EFL settings through various technology-based strategies and models. Online platforms like Kahoot, Quizizz, and Socrative enable interactive quizzes and games with immediate feedback (Bailey et al., 2023). Learning management systems (LMS) such as Moodle, Canvas, and Google Classroom support assessment creation,

discussion forums, and collaborative activities. E-portfolios using tools like Seesaw, Google Sites, or Mahara allow students to showcase language proficiency and engage in self-assessment. Platforms like Grammarly, Peergrade, and Turnitin facilitate peer review and feedback on written assignments, fostering collaborative learning and critical thinking. Virtual reality (VR) applications like VRChat or ClassVR offer immersive language learning environments for practical skill application and feedback. Adaptive learning platforms such as Duolingo, Elsa, or Babbel tailor exercises to individual performance, enhancing language skills. Online discussion and collaboration platforms like Padlet, Flipgrid, or Edmodo facilitate written expression, peer feedback, and collaborative learning (Bailey et al., 2023).

Expanding the participant pool in future studies is recommended to deepen understanding of teachers' perspectives, inquiries, and potential shortcomings, requiring additional interview questions. Policymakers must consider thoughtful policy measures to expedite internet network establishment, ensuring universal access across Indonesia to facilitate seamless integration of technology-based assessments and other educational initiatives within the digital era.

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