

Research Article:

Design and Development of English-speaking Skills Formative Assessment Tool for Students with Autism Spectrum Disorder through Project-Based Learning: A Needs Analysis

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ABSTRACT

Children with Autism Spectrum Disorder (ASD) often face communication challenges, including echolalia, literal interpretation, and speech delays, which hinder their spoken language development and social interactions. Formative assessment provides ongoing feedback tailored to these unique needs, supporting language acquisition and tracking progress. Project-Based Learning (PBL) further enhances language development by engaging students in meaningful, real-world tasks that promote practical communication and social regulation skills. In Malaysia, where ASD students' speaking skills are assessed using standardised Classroom-Based Assessment (CBA), this study explores the need for a specialised formative assessment tool. Designed for primary school settings, the proposed tool incorporates instruments, rubrics, and performance descriptors specific to ASD learners. Data accumulated from teachers' responses using survey design were analysed statistically. Four primary factors affect the needs of having this formative assessment tools: (1) teachers' perceptions; (2) teachers' practices; (3) teachers' difficulties; and (4) teachers' knowledge and abilities. The findings from the needs analysis indicate a clear need for the design and development of a PBL-based formative assessment tool specifically aimed at enhancing English-speaking skills in students with ASD.

Keywords: English-speaking skills, formative assessment, Project-Based Learning, needs analysis, Autism Spectrum Disorder, ASD

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a developmental disorder that affects a child's development. It is usually detected before the age of three, around the age of 30 months (Badzis & Zaini, 2014; Paulraj et al., 2016). Studies continue to indicate a significant rise in the prevalence of ASD diagnoses, especially during early childhood. Maenner et al. (2023) suggest that ASD affects approximately 1 in 36 children aged 8 years in the United States, a figure derived from data collected in 2020. This prevalence rate is notably higher compared to many other developmental disabilities, such as Down syndrome or cerebral palsy, underscoring the unique challenges posed by ASD. Meanwhile, by the year 2024, 102,246 children with disabilities have been enrolled in Malaysian schools (Ministry of Education Malaysia, 2024). Of this number, almost 25% of students enrolled have ASD (Low et al., 2018) and a substantial proportion requires specialised educational strategies and tools for skill acquisition, particularly within special education frameworks.

Students with ASD often experience neuropsychological challenges, including limited communication abilities, which impede their social interactions and connection-building (Rabi, 2015). These challenges manifest in both verbal and non-verbal communication difficulties and are often accompanied by repetitive behaviours (Hannan et al., 2020; Happe & Frith, 2020). Hashim et al. (2021) noted that cognitive disabilities make it harder for ASD students to acquire new vocabulary, further hindering their ability to respond and interact effectively. Interestingly, evidence shows that students with ASD may learn English faster than their native language due to its structural simplicity and fewer syllables, facilitating easier comprehension (Haifa et al., 2023). Among the core English language skills, speaking is paramount, especially for ASD learners, as it lays the foundation for developing literacy skills such as reading and writing (Riduan et al., 2021). Despite being challenging, speaking is crucial for overcoming communication barriers and preparing students for broader literacy acquisition, making it a focal point in instruction for ASD learners (Zakaria et al., 2019; Hassan et al., 2021).

In Malaysian primary schools, students, including those with ASD in the Integrated Special Education Program (ISEP), are taught English-speaking skills and assessed using the similar Classroom-Based Assessment (CBA) established under the English language curriculum. Despite the assessment conducted per individual student, the curriculum, together with the assessment rubric designed may not suit the students with ASD. Students with ASD often display abilities that markedly differ from those of peers without developmental disorders, reflecting the unique characteristics and challenges associated with the condition (Garnett et al., 2018; Trembath et al., 2020). Ganz et al. (2023) noted that the existing frameworks are rarely adapted to the complex communication needs of students with ASD, particularly for evaluating both verbal and nonverbal elements of English-speaking skills. Until recently, in Malaysia, the process by which children with ASD acquire the English language remains poorly understood, with limited research exploring the specific challenges and strategies relevant to their unique learning needs (Sabri et al., 2021). This raises a critical question of how teachers can effectively assess the

English-speaking skills of ASD students without a standardised formative assessment tool, especially when these students are expected to follow the same prescribed syllabus.

Project-Based Learning (PBL), a cornerstone of authentic pedagogy, emphasises learning through interdisciplinary projects that mirror real-world applications. William Kilpatrick's "project method", introduced in 1918, advocates for experiential and student-centered learning, making it a vital tool for 21st-century education (Hynek, 2017; Ngereja et al., 2020). In Malaysia, PBL aligns with the goals of the Malaysian Education Blueprint (2013–2025), which emphasises holistic education through formative assessment and the development of higher-order thinking skills. Since its integration into government schools in 2006, PBL has been recognised for enhancing autonomy and learning interest, preparing students to meet the demands of a dynamic educational landscape (Manap et al., 2020; Riduan et al., 2021). By incorporating PBL into formative assessments, educators can offer students with ASD a robust framework for personal and academic success (Dymond et al., 2015).

LITERATURE REVIEW

Given the objective of this study is to identify the need to design and develop a formative assessment tool specifically tailored for evaluating English-speaking skills among students with ASD in Malaysian primary schools utilising PBL as the instructional framework, the needs analysis process is guided by McKillip's Discrepancy Model (1987). The model emphasises determining gaps between current services and desired outcomes (Cuiccio & Husby-Slater, 2018). According to McKillip (1987), needs are decisions about the importance of addressing problems that a group faces and that have feasible solutions. In education and human services, needs analysis is essential for informed decision-making as it assesses and identifies various needs (Hamid et al., 2020). A needs analysis is a critical instrument for evaluating whether the current services provided to a population adequately address their requirements. When these services are found lacking, and effective remedies are available, it highlights a demand for intervention (Arumugam et al., 2019).

In this study, the primary focus is to explore the current practices and challenges experienced by teachers within the ISEP. By investigating these factors, the research aims to identify significant obstacles and areas in need of targeted interventions, which could lead to improvements in teaching strategies and student outcomes. For students with ASD, such an analysis helps ensure that the learning tools and approaches employed are both relevant and effective, aligning educational outcomes with their unique needs. In order to present a more lucid picture of the topics addressed in this study, a concept-based literature review was conducted, encompassing these key areas: (1) English-speaking skills, (2) formative assessment, and (3) PBL, followed by a theoretical framework underpinning the study.

English-Speaking Skills

English-speaking skills involve the ability to communicate information clearly and accurately in oral English, encompassing pronunciation, vocabulary, grammar, fluency, comprehension and task (Brown, 2004). These skills underpin effective communication across diverse social, academic and professional settings, fostering meaningful exchanges that convey genuine thoughts, emotions and perspectives (Richards, 2015). The development of these skills is particularly essential for effective communication (Ramlah et al., 2023). Speaking is an essential skill that not only supports verbal interaction but also bridges gaps in understanding and collaboration (Nation & Newton, 2020).

For individuals with ASD, challenges in social communication often impede spoken language development (Lord et al., 2020). Specific challenges such as difficulties with prosody, turn-taking and interpreting conversational cues can hinder their ability to engage in meaningful dialogue (Paul et al., 2018), while echolalia, a tendency to repeat heard phrase, can interfere with developing spontaneous speech (Paul et al., 2017). Such challenges can significantly hinder their capacity to build relationships and engage in meaningful communication (McTigue & Fuchs, 2017).

Formative Assessment

Formative assessment, often described as “assessment for learning”, serves as a dynamic tool for refining teaching strategies in response to immediate feedback and evidence (Wiliam, 2017), ensuring alignment with students’ learning needs. Black and Wiliam (2018) emphasise that formative assessment involves gathering and interpreting evidence about student learning to inform teaching and enhance student outcomes. Embedded within classroom practices, effective formative assessments include the clear articulation of learning goals and the provision of constructive feedback, encouraging active student involvement in the learning process (Heritage, 2018; Andrade, 2019).

Formative assessment is especially advantageous for students with ASD, as it provides personalised feedback and allows for task modifications that cater to their specific learning needs. These modifications may include breaking down tasks into smaller, more manageable steps, offering visual supports, to minimise anxiety and enhance student engagement (Hodges et al., 2020; Smith et al., 2021). Additionally, formative assessment helps support the development of essential skills in language, social interaction and collaboration, offering a structured yet flexible approach to meet the diverse needs of students with ASD while promoting their holistic participation in the curriculum (Elder et al., 2006).

Project-Based Learning

Project Based Learning (PBL), a dynamic strategy within formative assessment, emphasises learner-centred activities linked to real-world contexts, enabling deeper exploration beyond rigid lesson plans (Duke et al., 2021). By fostering active inquiry, PBL supports individualised learning (Gallagher & Gallagher, 2013) while developing critical thinking and problem-solving skills (Al-Balushi & Al-Aamri, 2014; He et al., 2023). Barriers to effective implementation of PBL often include rigid curricula, limited resources, and time constraints (Tamim & Grant, 2013; Guo et al., 2020). These challenges can restrict the necessary flexibility and creativity for designing impactful PBL experiences (Condliffe et al., 2017). The success of PBL relies on teacher scaffolding and shared goal-setting to enhance autonomy and insight into learning (Gresalfi et al., 2012). On the other hand, PBL benefits students with ASD by offering structured, hands-on learning that fosters social skills, reduces anxiety, and supports executive functioning through tailored, engaging projects (Larson & Miller, 2011; Gallagher & Gallagher, 2013). Furthermore, adaptive learning strategies within PBL, which offer flexibility in pacing and methods, are instrumental in maintaining sustained interest and promoting cognitive development across diverse learning populations, including students with ASD (Hwang et al., 2020).

Underpinning Theories

The development of the English-speaking skills formative assessment tool draws upon foundational theories articulated by prominent scholars in education. Firstly, the theory of Mastery Learning, pioneered by Bloom et al. (1971), which emphasises the importance of allowing students to progress at their own pace and achieve mastery of each concept before moving on to the next. Another influential theory is Learning by Doing, as advocated by Dewey (1938), which highlights the value of hands-on, experiential learning where students actively engage with the material through practical application. Additionally, the framework incorporates principles of Social Constructivism, as elucidated by Vygotsky (1934), which underscores the role of social interaction and collaborative learning environments in shaping cognitive development. By integrating these three theoretical perspectives, the formative assessment tool seeks to provide a comprehensive approach to assessing and fostering English-speaking skills among students, particularly those with ASD, through PBL initiatives.

Bloom's Mastery Learning Theory describes six stages of formative assessment: (1) remembering (recall), (2) understanding, (3) applying, (4) analysing, (5) evaluating, and (6) creating (synthesising). Dewey's Learning by Doing Theory emphasises student centred learning, in-depth investigation of a topic and designing and producing end product. Vygotsky's Social Constructivism highlights the elements of children's learning development, social interaction, constructing knowledge by problem-solving and inquiry-based learning. The outcomes of this theoretical framework will lead to the development of the English-speaking skills instruments, rubrics and performance descriptors based on

six components of English-speaking skills as outlined by Brown (2004). Figure 1 shows the theoretical basis for designing and developing an English-speaking skills formative assessment tool for students with ASD through PBL.

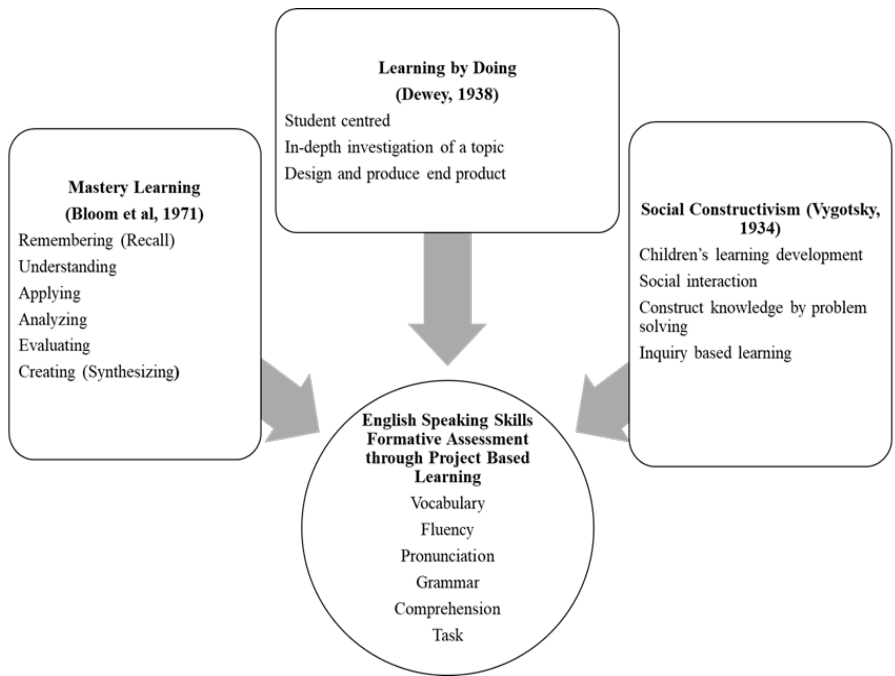


Figure 1. Theoretical framework of the study

METHODOLOGY

The needs analysis employed in this study is a part of a bigger research utilising the Design and Development Research (DDR) approach by Richey and Klein (2007). Despite the three phases DDR comprises: (1) need analysis, (2) design and development, and (3) implementation and evaluation, this article only focuses on the needs analysis methodology as it is the core element required before designing and developing the formative assessment tool.

Research Design

DDR is described as a methodology for creating new procedures, techniques and tools based on specific needs analysis (Richey & Klein, 2007). This approach is particularly

useful for designing and developing interventions that address complex educational challenges, while also contributing to a deeper understanding of the characteristics of these interventions and the processes involved in their design (Plomp, 2013). Therefore, DDR is well-suited for designing and developing a formative assessment tool for assessing English-speaking skills in students with ASD through PBL. By leveraging DDR, the process ensures that the assessment is tailored to the specific needs of the students, addressing both educational challenges and the need for effective learning tools. This approach allows for the creation of interventions that are both practical and theoretically grounded, offering a way to systematically enhance teaching strategies and learning outcomes for ASD students.

Sampling Method

Cluster sampling was used in this study to ensure that the sample accurately represents the target population of English teachers in the ISEP who teach students with ASD in the northern part of Malaysia. Cluster sampling is a technique where the population is divided into distinct groups, or clusters, and a random selection of these clusters is made to form the sample (Creswell, 2014). In this case, the clusters were the ISEPs in the states of Perlis, Pulau Pinang, and Kedah. In total, there are 19 ISEPs in Perlis, 131 in Kedah and 46 in Pulau Pinang. The list of these schools was obtained with the cooperation of Special Education Department, Ministry of Education, Malaysia. Once the clusters were identified, a stratified approach was applied to ensure each region was proportionally represented based on the number of schools in each state.

This method is particularly effective when the population is spread across a large geographical area, as it reduces costs and logistical challenges while maintaining the ability to make inferences about the broader population (Etikan et al., 2016). Sixty English teachers were selected, with 25 from Kedah, 19 from Pulau Pinang and 16 from Perlis, with prior consent obtained from each participant, ensuring that the sampling process was ethically conducted and the selected group reflected the diversity of ISEP teachers across the three states.

Instrument

To perform the needs analysis, a questionnaire comprising 44 items was utilised, employing a five-point Likert-type scale ranging from “Strongly Disagree” to “Strongly Agree”. Apart from the demographic background asking the respondents’ gender, age group, state of duty, years of teaching experience and academic qualification, the instrument serves four primary purposes. Table 1 presents the specifications for the four primary sections of the needs analysis instrument.

Table 1. Specifications for needs analysis instrument

Part	Construct	Number of items
B	Teachers' perceptions of the implementation of PBL in teaching English-speaking skills for students with ASD	12
C	Teachers' practices in the implementation of PBL in teaching English-speaking skills for students with ASD	10
D	Teacher's difficulties in implementing PBL in teaching English-speaking skills for students with ASD	10
E	Teachers' knowledge and ability in implementing formative assessment in order to assess English-speaking skills among students with ASD	12

The instrument was adapted from Hussin (2019). The original instrument of Hussin (2019) titled “Formative Assessment Practice and its Influencing Factors among Teachers Teaching Living Skills” focused on identifying the extent of the implementation of formative assessment among teachers in Malaysia. To suit the study of teaching English-speaking skills through PBL to students with ASD, it had been incorporated prompts that related to the scenarios of teachers at the ISEP. The original instrument was chosen for its strong foundation in formative assessment and its validated structure as this study uses the adaptations to ensure it aligns with the needs of having a formative assessment tool in assessing English-speaking skills of students with ASD in the context of PBL while maintaining methodological rigor. Featuring both English and Malay languages, the instrument was validated by two experts for its content and two others for language. For content validation, two experts in the field of special education from Malaysia Teacher Training Institute had been identified and contributed to this procedure. On the other hand, for language validation, two experts in English language were invited to validate the linguistic accuracy and appropriateness of the content. Their role was crucial in ensuring that the translation and language usage in both versions of the instrument maintain clarity, precision and consistency, thereby making sure that the questions were effectively communicated to the respondents in both languages. One of the experts is a lecturer from a public university in Malaysia whose expertise is in the Teaching English to Speakers of Other Languages (TESOL) and the other expert is a Deputy Director from English Language Division, Ministry of Education, Malaysia. All the experts have over 10 years of experience in their respective fields of expertise.

Pilot Test

The reliability was confirmed through a pilot test. With voluntary involvement as a prerequisite for inclusion in the study, the pilot test involved a number of 30 teachers from the ISEP who teach students with ASD. Shafie et al. (2021) indicated that in education and behavioural sciences, a commonly recommended guideline for determining the appropriate sample size for a pilot test is to include at least 30 respondents. This

standard ensures sufficient data to identify potential issues with the study design and to make initial statistical inferences. The test indicates a total Cronbach's alpha coefficient value of 0.880 as shown in Table 2. This demonstrates the suggested level of internal consistency, which can be construed as highly reliable according to Cohen et al. (2018).

Table 2. Value of Cronbach's Alpha for needs analysis instrument

Part	Construct	Cronbach's Alpha
B	Teachers' perceptions of implementing PBL in teaching English-speaking skills to students with ASD	0.949
C	Teachers' practices in implementing PBL in teaching English-speaking skill for students with ASD	0.904
D	Teachers' difficulties towards the implementation of PBL in teaching English-speaking skill for students with ASD	0.773
E	Teachers' knowledge and ability to use formative assessment for evaluating English-speaking skills among students with ASD	0.893
Overall		0.880

Data Collection Procedure

Before distributing the questionnaire to the sampled teachers, approval had been obtained from the Planning and Policy Research Division of the Ministry of Education Malaysia. Subsequently, approval from the Education Departments of Pulau Pinang, Kedah, and Perlis was obtained as well. It took two months to collect all the required responses from the respondents. The data gathered were analysed using the Statistical Package for Social Science (SPSS) version 27 software, tabulating the frequency counts, percentage, mean and standard deviations.

RESULTS

The results of this study are presented as follows.

Teachers' Perceptions of the Implementation of PBL in Teaching English-Speaking Skills to Students with ASD

Table 3 shows the findings of Part B regarding the teachers' perceptions. The item with the highest mean score was item "PBL improves the English-speaking skills acquisition of students with ASD" ($M = 4.15$; $SD = 0.55$), followed by item "students with ASD acquire more English vocabulary when taught using the PBL approach" ($M = 4.08$; $SD = 0.70$) and item "students with ASD are more interested in learning via the PBL

approach” (M = 4.05; SD = 0.60). On the other hand, the item with the lowest mean was “PBL is a good approach for students with ASD” (M = 3.75; SD = 0.73).

Table 3. Teachers’ perceptions of implementing PBL in teaching English-speaking skills to students with ASD

No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
B1	PBL improves the English-speaking skills acquisition of students with ASD	-	1.70	3.30	73.30	21.70	4.15	0.55
B2	Students with ASD acquire more English vocabulary when taught using the PBL approach	-	3.30	10.00	61.70	25.00	4.08	0.70
B6	Students with ASD are more interested in learning through the PBL approach.	-	-	15.00	65.00	20.00	4.05	0.60
B3	PBL encourages students with ASD to talk and interact more with teachers during English language lesson.	-	3.30	13.30	65.00	18.30	3.98	0.68
B10	PBL improves the English pronunciation among students with ASD.	-	1.70	15.00	68.30	15.00	3.97	0.61
B9	PBL facilitates the learning of English grammar among students with ASD.	-	1.70	13.30	71.70	13.30	3.97	0.58
B8	Motivation of students with ASD in learning increases when using the PBL approach.	-	-	21.70	61.70	16.70	3.95	0.62
B5	PBL helps students with ASD to express their opinions and give ideas.	-	3.30	16.70	63.30	16.70	3.93	0.69

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No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
B12	PBL has a positive effect on the English-speaking skills acquisition of students with ASD.	-	5.00	21.70	53.30	20.00	3.88	0.78
B4	PBL helps students with ASD to talk and interact more with friends in the classroom.	-	5.00	23.30	53.30	18.30	3.85	0.78
B7	Students with ASD demonstrate greater fluency in communication with teachers when using PBL approach.	-	1.70	31.70	53.30	13.30	3.78	0.70
B11	PBL is a good approach for students with ASD.	-	5.00	26.70	56.70	11.70	3.75	0.73
Average		-	3.17	17.64	62.22	17.50	3.95	0.67

Overall, all items in this part achieved a high average mean ($M = 3.95$) and a low standard deviation ($SD = 0.67$). The mean values for the items ranged between 3.75 and 4.15, while the standard deviations ranged from 0.55 to 0.78. This low average standard deviation indicates strong consensus among English language teachers in the ISEP, suggesting they shared similar perceptions regarding the implementation of PBL in teaching English-speaking skills to students with ASD. In summary, the majority of respondents (62.22%) selected item 4, representing agreement with the items in this part.

Teachers' Practices in The Implementation of PBL in Teaching English-Speaking Skills for Students with ASD

Table 4 shows the findings of Part C regarding the teachers' practices. The item with the highest mean was "I usually correct students' pronunciation while teaching English-speaking skills through PBL" ($M = 4.07$; $SD = 0.55$), followed by "I prefer a student-centered approach while teaching English-speaking skills through PBL" ($M = 3.92$; $SD = 0.59$), and "I always create conditions for students to practice speaking while doing project work in English language class" ($M = 3.78$; $SD = 0.67$). The item with the lowest mean was "I don't need training related to PBL" ($M = 2.80$; $SD = 0.92$).

Table 4. Teachers' practices in implementing PBL for English-speaking skills in ASD students

No	Item	Percentage					Mean	SD
		1	2	3	4	5		
C7	I usually correct students' pronunciation while teaching English-speaking skills through PBL.	-	-	11.70	70.00	18.30	4.07	0.55
C6	I prefer student centred approach while teaching English-speaking skills through PBL.	-	1.70	16.70	70.00	11.70	3.92	0.59
C4	I always create conditions for students to practice speaking while doing project work in English language class.	-	3.30	25.00	61.70	10.00	3.78	0.67
C1	I possess the necessary proficiency in English to teach speaking skills to students with ASD.	-	1.70	31.70	56.70	10.00	3.75	0.65
C3	I can use various strategies to promote the English-speaking skills through PBL in class.	-	1.70	31.70	56.70	10.00	3.75	0.65
C8	I usually evaluate the speaking performance of students with ASD through oral presentations.	-	13.30	13.30	63.30	10.00	3.70	0.83
C9	My prior knowledge was sufficient for me to guide students with ASD in implementing PBL.	-	5.00	46.70	41.70	6.70	3.50	0.70
C2	I am proficient in using the PBL approach for students with ASD in English-speaking skills lessons.	-	3.30	43.30	48.30	5.00	3.55	0.65
C5	I often emphasise grammar while teaching English-speaking skills through PBL.	-	1.70	55.00	36.70	6.70	3.48	0.65
C10	I don't need training related to PBL.	1.70	43.30	33.30	16.70	5.00	2.80	0.92
Average		1.70	8.33	30.84	52.18	9.34	3.63	0.69

Overall, all items achieved a high average mean ($M = 3.63$) with a relatively low standard deviation ($SD = 0.69$), indicating consistency in responses. The means for items ranged from 2.80 to 4.07, and the standard deviation ranged from 0.55 to 0.92. This low standard deviation suggests a strong consensus among English language teachers in the ISEP on their practices in implementing PBL for teaching English-speaking skills to students with ASD. In summary, the majority of respondents (52.18%) selected 4, showing agreement with the items in this section.

Teachers' Difficulties in Implementing PBL in Teaching English-Speaking Skills to Students with ASD

Table 5 shows the findings of Part D regarding the teachers' difficulties. The item with the highest mean was item "I have received courses related to PBL" ($M = 3.13$; $SD = 0.95$), followed by item "There is a special space/room provided to implement PBL" ($M = 2.97$; $SD = 1.00$) and item "The space in the classroom is suitable for conducting PBL" ($M = 2.92$; $SD = 0.89$). On the other hand, the item with the lowest mean was item "Teaching aids and materials are available for teachers to implement PBL" ($M = 2.55$; $SD = 0.91$). Since the items in this section are phrased positively, the data must be recoded using the SPSS to accurately reflect the challenges faced by the teachers.

Table 5. Teachers' difficulties in implementing PBL for teaching English speaking skills to students with ASD

No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
D10	I have received courses related to PBL.	1.70	38.30	40.00	11.70	8.30	3.13	0.95
D6	There is a special space/room provided to implement PBL.	1.70	38.30	20.00	35.00	5.00	2.97	1.00
D5	The space in the classroom is suitable for conducting PBL.	1.70	30.00	26.70	41.70	-	2.92	0.89
D1	I do not have problem with time management when doing PBL.	3.30	26.70	26.70	43.30	-	2.90	0.92

(continued on next page)

No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
D4	Students with ASD demonstrate cooperation throughout the learning process.	1.70	15.00	48.30	35.00	-	2.83	0.74
D9	I am skillful in implementing PBL for teaching English-speaking skills.	1.70	15.00	48.30	35.00	-	2.83	0.74
D3	I do not have difficulties handling the students with ASD when conducting PBL.	5.00	15.00	28.30	51.70	-	2.73	0.90
D2	I do not have problem managing the resources and materials when doing PBL.	1.70	18.30	23.30	56.70	-	2.65	0.84
D8	Financial resources are available for the implementation of PBL.	1.70	21.70	23.30	41.70	11.70	2.60	1.01
D7	Teaching aids and materials are available for teachers to implement PBL.	-	18.30	28.30	43.30	10.00	2.55	0.91
Average		2.24	23.67	31.32	39.51	8.75	2.81	0.89

Overall, all of the items in this part achieved an average mean ($M = 2.81$) and a low average standard deviation ($SD = 0.89$). The means for the items in this part ranged between 2.55 and 3.13, with standard deviations between 0.74 and 1.01. This low average standard deviation indicates a high level of consensus among the English language teachers in the ISEP, suggesting they shared similar difficulties in the implementation of PBL for teaching English-speaking skills to students with ASD. In summary, most respondents selected item “4” (39.51%) and item “3” (31.32%), indicating agreement with the challenges in this part.

Teachers' Knowledge and Abilities in Implementing Formative Assessment to Assess English-Speaking Skills Among Students with ASD

Table 6 shows the findings of Part E regarding the teachers' knowledge and ability in implementing formative assessment to assess English-speaking skills among students with ASD. The item with the highest mean was item "I can clearly distinguish between forms of alternative assessment and traditional assessment (written examination)" ($M = 3.95$; $SD = 0.53$), followed by item "the development of a specific English-speaking skills formative assessment tool for students with ASD can help teachers provide suitable intervention and enrichment strategies according to the needs of the students" ($M = 3.90$; $SD = 0.63$) and item "I can modify the teaching based on the reaction and feedback obtained from the students through formative assessment" ($M = 3.87$; $SD = 0.50$). On the other hand, the item with the lowest mean was "I understand how to prepare a scoring scheme/rubric based on DSKP" ($M = 3.48$; $SD = 0.62$).

Table 6. Teachers' knowledge and abilities in implementing formative assessment for assessing English-speaking skills in students with ASD

No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
E1	I can clearly distinguish between forms of alternative assessment and traditional assessment (written examination).	-	-	16.70	71.70	11.70	3.95	0.53
E12	The development of a specific English-speaking skills formative assessment tool for students with ASD can help teachers in providing suitable intervention and enrichment strategies tailored to the students' needs.	-	3.30	15.00	70.00	11.70	3.90	0.63
E8	I can modify the teaching based on the reaction and feedback obtained from the students through formative assessment.	-	-	20.00	73.30	6.70	3.87	0.50
E7	I know clearly to what extent the level of guidance that can be provided to students in implementing formative assessment.	-	1.70	20.00	71.70	6.70	3.83	0.56

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No.	Item	Percentage					Mean	SD
		1	2	3	4	5		
E10	I can identify and take action on the diversity of student learning needs through formative assessment.	-	1.70	26.70	60.00	11.70	3.82	0.65
E9	I clearly understand how to evaluate the student's progress in implementing formative assessment.	-	1.70	23.30	68.30	6.70	3.80	0.58
E2	I have a clear understanding of the elements that need to be assessed for English-speaking skills based on <i>Dokumen Standard Kurikulum dan Pentaksiran</i> (DSKP).	-	3.30	23.30	66.70	6.70	3.77	0.62
E3	I am knowledgeable about the appropriate instrument for formative assessment of English-speaking skills.	-	-	30.00	63.30	6.70	3.77	0.56
E11	I agree with the necessity for a specific formative assessment for students with ASD.	-	6.70	21.70	63.30	8.30	3.73	0.71
E5	I know clearly when it is necessary to use various assessment methods, such as observation, oral or written in carrying out formative assessment.	-	5.00	26.70	61.70	6.70	3.70	0.67
E6	I clearly understand how to integrate English-speaking skills formative assessment into teaching and learning session.	-	3.30	30.00	60.00	6.70	3.70	0.65
E4	I understand how to prepare a scoring scheme/ rubric based on DSKP.	-	5.00	43.30	50.00	1.70	3.48	0.62
Average		-	3.52	24.73	65.00	7.67	3.78	0.61

Overall, the items in this part achieved a high average mean ($M = 3.78$) and a relatively low standard deviation ($SD = 0.61$). The means for these items ranged from 3.48 to 3.95, while the standard deviation varied between 0.50 and 0.71. This low standard deviation indicates strong consensus among the English language teachers in the ISEP, suggesting that they shared similar levels of knowledge and ability in implementing formative assessment for evaluating English-speaking skills among students with ASD. In summary, the majority of respondents selected item 4 (65.00%), representing agreement, followed by item 3 (24.73%), indicating a neutral response to the items in this section.

DISCUSSION

Teachers' Perceptions of the Implementation of PBL in Teaching English-Speaking Skills to Students with ASD

The findings generally portray that teachers perceive PBL as a form of instruction that enhances students' acquisition of English-speaking skills, particularly in terms of vocabulary growth and engagement (Al-Balushi & Al-Aamri, 2014). In other words, they view PBL as a dual-purpose method that both facilitates language development and fosters active student involvement (Heritage, 2018; Andrade, 2019). This alignment between language skills acquisition (Ramlah et al., 2023) and increased motivation underscores the potential of PBL to meet the unique needs of students with ASD, who often benefit from the structure, interactivity and hands-on experiences that PBL offers (Larson & Miller, 2011; Gallagher & Gallagher, 2013). Meanwhile, teachers also emphasise the importance of pronunciation correction for developing communicative competence, as suggested by Brown (2004), reflecting their commitment to a student-centred approach that prioritises scaffolding and shared goal-setting in allowing students to have space for self-improvement (Gresalfi et al., 2012). This perspective aligns with PBL's interactive design, which many educators believe effectively addresses the unique needs of ASD students through structured, hands-on learning experiences that foster both language acquisition and confidence.

Teachers' Practices in The Implementation of PBL in Teaching English-Speaking Skills for Students with ASD

The study underscores teachers' alignment with the principles of PBL, particularly its focus on student engagement, autonomy and active participation. Teachers view a student-centred approach as essential for allowing students with ASD to explore and express themselves, fostering meaningful language practice in real-world contexts (Condliffe et al., 2017). This approach, which provides consistent and varied speaking practice, is especially beneficial for improving language acquisition and confidence in ASD learners. Additionally, PBL's flexibility enables tailored modifications to meet

individual student needs, promoting academic and personal growth (Dymond et al., 2015). However, concerns persist about the universal applicability of PBL for diverse skill areas and ASD-specific challenges (Guldborg, 2010). This highlights the need for tailored strategies and professional development to enhance teachers' confidence and competence in implementing PBL. Effective rubrics and scoring systems aligned with the national curriculum are also critical, emphasising the importance of specialised training (Khalid et al., 2015). Addressing these areas is pivotal to optimising PBL's effectiveness for ASD students.

Teachers' Difficulties in Implementing PBL in Teaching English-Speaking Skills to Students with ASD

The study suggests that professional development opportunities exist, but they may not be widespread enough to equip all teachers with the necessary skills and knowledge for effective PBL implementation. The data further highlight a recognition among teachers of the importance of an appropriate learning environment to facilitate effective project work. However, the study indicates that many teachers may feel constrained by their classroom settings, which could limit their ability to engage students fully in PBL activities. Lack of teaching aids and materials may pose a substantial barrier to the effective implementation of PBL (Tamim & Grant, 2013; Guo et al., 2020). To enhance the effectiveness of PBL in teaching, it is essential to address these resource shortages. In summary, while teachers have some training and acknowledge the importance of a suitable environment, the findings underscore a critical need for additional professional development and resource allocation. Providing teachers with access to teaching aids, appropriate classroom spaces and comprehensive training could greatly enhance the effectiveness of PBL in improving students' learning experiences.

Teachers' Knowledge and Abilities in Implementing Formative Assessment to Assess English-Speaking Skill among Students with ASD

The study reveals that teachers possess a strong grasp of formative assessment methods for evaluating English-speaking skills in students with ASD, particularly in distinguishing between alternative and traditional assessments. This understanding underscores their awareness of the necessity for varied assessment strategies that cater to the unique learning needs of ASD students. This is in line with Elder et al. (2006) that formative assessment promotes ongoing adjustments, tailored feedback, and task adaptations which are personalised to each student with ASD, considering each of their unique challenges. Additionally, teachers demonstrate confidence in adapting their instruction based on student needs, which contributes to improved engagement and educational outcomes. However, the data emerges the importance of a supportive learning environment for successful project work. Many teachers feel constrained by their classroom settings, which can limit student engagement. Therefore, addressing resource shortages and providing comprehensive training are crucial for enhancing PBL effectiveness.

CONCLUSION

In summary, the study analysed the needs of having a formative assessment tool in teaching English-speaking skills for students with ASD through PPBL in ISEP in the northern part of Malaysia. The teachers involved agreed that the development of a specific English-speaking skills formative assessment tool for students with ASD can help teachers provide suitable intervention and enrichment strategies according to the needs of the students. With the challenges get addressed, the enhancement of speaking skills among students with ASD is predicted to be possible through the implementation of PBL-based formative assessment.

To conclude, this study is believed to significantly contribute to the existing body of knowledge by providing insights into the opportunities and challenges associated with the formative assessment implementation, particularly in the context of English language instruction for students with ASD. By systematically examining the perceptions and practices of educators, this research not only highlights the potential effectiveness of PBL as an instructional strategy but also identifies specific areas for professional development and resource allocation.

Furthermore, the findings offer practical implications that extend beyond academic discourse for educators, policymakers and stakeholders involved in special education. By equipping teachers with the necessary tools and strategies to assess and enhance the English speaking skills of students with ASD, this study contributes to fostering more inclusive educational environments. Ultimately, the insights gained from this research can inform future initiatives aimed at improving language acquisition outcomes for students with ASD, thereby benefitting society as a whole by promoting greater communication abilities and social integration for individuals with diverse learning needs.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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