



DESIGNING SEQUENTIAL SPEAKING SYLLABI FOR HIGHER EDUCATION THROUGH AI-ENHANCED PBL

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abstract

Indonesia's persistently low English Proficiency Index (EPI) is caused by limited literacy and traditional pedagogies, resulting in weak speaking competency. This study aimed to create sequential speaking course syllabi incorporating Artificial Intelligence (AI) into Project-Based Learning (PBL) to enable enhanced speaking skills in higher education. Employing a Research and Development (R&D) design streamlined from Borg and Gall into three phases consisting of preliminary study, development, and validation. The study collected data through focus group discussions, interview, document analysis, and expert verification. Three syllabi were constructed on Speaking for Daily Purposes, Speaking at Workplace, and Speaking for Academic Purposes that were aligned with CEFR levels B1, B2, and C1. Validation employed two experts: an AI expert and a PBL-speaking expert. Scores indicate high feasibility, 90, 91, and 89 in AI expert scores, and 79.7 in PBL-speaking expert scores across syllabi, which are in the "Very Good" category. Revisions were done to order material, incorporate projects, and coordinate assignments to sufficiently address speaking skills. The originality lies in incorporating CEFR-based progression and AI tools in PBL to create oral competence as well as digital literacy and autonomous learning. These syllabi present a model for incorporating technology-supported, student-centered approaches into language teaching. Future research should examine effectiveness through classroom trials and broader implementation to gauge learning impacts and scalability.

INTRODUCTION

The limited English proficiency in Indonesia has become one of the persistent education problems over recent years. The English Proficiency Index (EPI), developed by Education First (EF), provides global comparative information regarding English proficiency levels. EF Education First (2022) placed Indonesia at the 81st rank out of 111 countries worldwide and at the 15th rank among 24 Asian countries (EF Education First, 2022). These data suggest Indonesia's English ability still trails behind global and regional averages, and this poses an imperative for reconsidering English teaching and learning culture. Because English proficiency is among the main determinants of competitiveness in a globalized economy, the findings raise pedagogical issues of great concern regarding Indonesian higher-level English education.

A few studies suggested that Indonesia's low EPI is influenced by interlinked education and literacy issues. Low literacy levels are one of the significant causes of low English proficiency (D. Putri, Bumela, & Ikawati, 2022). The Programme for International Student Assessment (PISA), designed by OECD, released Indonesian students' reading ability score of 371, positioning the country in the ranking of countries with low literacy (OECD, 2018). Additionally, the persistence of conventional, memorization, and teacher-centered pedagogy

has been identified as another central catalyst for low English achievement (Helyanti, Bumela, & Ikawati, 2022). The pedagogical style does not go along with the ideology of learning in the 21st century that encourages autonomous and inquiry-based learning from diverse sources, a term Lian & Pineda (2014) called rhizomatic learning. Thus, the quality of literacy and English speaking is affected.

Literacy is not a matter of mere reading and writing but also of the ability to receive, process, and use information efficiently (Khalifatussalam, 2021). When literacy quality is poor, productive skills such as speaking are automatically affected. As a productive skill, speaking requires students to interpret and convey information meaningfully, which is a challenge for learners with limited literacy bases. In global communication, speaking plays a vital role in enabling one to construct social relationships and transmit ideas effectively across cultures (Halimah, 2018). English proficiency itself can be broadly defined as the ability to use English to express meaning both orally and in writing (University of Southern Queensland, 2022). Therefore, innovations in speaking pedagogy must be employed to bridge the gap between current levels of proficiency and international communication demands.

Planning a course and curriculum design are crucial to improving language learning outcomes, including speaking. A well-designed course syllabus ensures that the learning process adheres to institutional goals and education quality requirements in the 21st century. Based on The Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 3 of 2020 on Higher Education National Standards, learning has to be interactive, integrative, scientific, effective, and student-centered. The syllabus is a guide that steers the implementation of these standards (LPP UMY, 2016; Nurdin, 2019). Nevertheless, the development of a course syllabus, particularly for sequential courses, is complex. Speaking is among the required courses taught in the English Language Department in three consecutive courses: Speaking for Daily Purposes, Speaking at Workplace, and Speaking for Academic Purposes. Despite clearly stated objectives, redundancies in learning goals and resources tend to occur, with students focusing on grades at the expense of building progressive communication skills.

Project-Based Learning (PBL) is an applicable pedagogical approach needed to transcend these types of challenges. PBL constitutes genuine inquiry through problem-solving, research, and integration of various sources of information (Markham et al., as cited Albritton & Stacks, 2016). It invites collaboration, creativity, and critical thinking (Kisyani as cited in Sari, 2022) in addressing the elements of good, student-focused learning mandated in national standards. Further, Larmer & Mergendoller (2010) emphasize that meaningful projects should entail inquiry, reflection, and public presentation that are commensurate with student development of 21st-century skills (The Partnership for 21st Century learning, 2009). Therefore, integrating PBL in the speaking course syllabi is likely to promote overall skill achievement and student independence.

Apart from pedagogy, technology use in learning, specifically Artificial Intelligence (AI), is increasingly important for 21st-century students who must become information, media, and technology literate (The Partnership for 21st Century Learning, 2009). AI is defined as computer systems capable of performing human-like cognitive functions such as reasoning, problem-solving, and learning (Knight & Rich as cited in Jamaaludin & Sulistyowati, 2021; Russell & Norvig, 2016). Studies have highlighted AI's potential to enhance learning effectiveness and engagement (Afrita, 2023; Chassignol, Khoroshavin, Klimova, & Bilyatdinova, 2018; Keerthiwansa, 2018). For instance, N. Putri & Permana (2020) found that AI-based media improved learning quality and motivation of students belonging to Generation Z. In English

learning contexts, AI programs such as chatbots and pronunciation analyzers were found to improve speaking proficiency (Han, 2020; Haristiani, 2019; Zhou & Wei, 2018).

While existing studies have only touched on syllabus design (Yunianto, 2021), project-based learning (Ekawati, 2017; Manurung, 2018; Oktaviani & Marlina, 2021), and teaching with AI support (Han, 2020; Haristiani, 2019), there have been no efforts made to incorporate AI into PBL-oriented syllabus design, particularly for sequenced speaking courses. Moreover, integration of worldwide standards such as the Common European Framework of Reference for Languages (CEFR), providing accurate descriptions of language proficiency at levels A1 to C2 (EF Education First, 2022; Sudaryanto & Widodo, 2020), has not been systematically integrated into such syllabi. Hence, the development of an AI-enhanced, PBL-centered sequential speaking syllabus aligned to CEFR levels is an innovative and pedagogically rich contribution.

This research, therefore, aimed to build and validate a set of sequential speaking course syllabi integrating Artificial Intelligence within a Project-Based Learning setting in higher education. It outlines the characteristics of the syllabi and the creative processes in the development of the syllabi, including the product validation results. The study is expected to provide empirical and pedagogical insights into how AI and PBL could be combined to enhance speaking proficiency, support learner autonomy, and integrate English instruction with global standards of education in the 21st century.

METHOD

This qualitative research used the R&D (Research & Development) design. R&D is used to develop and validate products in the field of education (Borg & Gall, 2003). The stages of R&D according to Borg and Gall (2003) consist of ten steps. However, in its implementation, some researchers simplify these stages based on the requirements and conditions of the research (Mesra, et al., 2023). This research applied the R&D stages of (Febriana, 2016) simplifying the 10 stages of Borg & Gall into 3, which include: (1) preliminary study, (2) development, and (3) validation. This research was conducted in a state Islamic university in West Java in September-December 2023.

The sources of data in this research consisted of primary and secondary data. Primary data were obtained from the Focus Group Discussion (FGD) and interviews, while secondary data were taken from documentation. The FGD was used to collect the data from three speaking lecturers to gain information about the obstacles in speaking learning and the characteristics of the course syllabi developed. Interviews were carried out to obtain data regarding the difficulties in speaking learning and the course syllabi characteristics from three students that took speaking sequential courses. Documentation which included the department curriculum, learning outcomes, and speaking course syllabi were collected to support the research. In the development phase, validation sheets were used to get the evaluation on the product developed from two experts. The researchers developed two validation sheets. The first validation sheet was given to the AI expert. It consisted of 25 indicators covering the aspects of course syllabi and AI. The second validation sheet was given to the PBL and speaking expert to assess the aspects of course syllabi, speaking, and PBL.

Data in the preliminary study stage was analysed using descriptive qualitative. In the validation stage, the data were analyzed using Likert scale. The validation scores were later converted into four scoring categories adopted from Ridwan (as cited in Febriana, 2016), namely Excellent (76-100), Good (51-75), Poor (26-50), and Unsatisfactory (0-25).

To obtain data validity, researchers used triangulation. Through triangulation, research results can be increased in credibility and validity (Denzin as cited in Noble & Heale, 2019).

This study used data source triangulation. Triangulation was conducted by comparing data from the FGD, interviews, and documentation.

FINDINGS AND DISCUSSION

Findings

Characteristics of Sequential Speaking Course Syllabi

The course syllabi characteristics were obtained at the preliminary study stage of the research. The preliminary study was conducted by reviewing the results of FGD with speaking lecturers, interviews with students, and documentation. The following are the characteristics of the developed course syllabi:

The course syllabi were developed based on CEFR.

Based on the FGD results, the speaking lecturers agreed that the sequential speaking course consisting of 3 speaking course syllabi, namely Speaking for Daily Purposes, Speaking at Workplace, and Speaking for Academic Purposes should be designed based on 3 different CEFR levels. In Speaking for Daily purposes, students learn speaking skills used in everyday contexts equivalent to CEFR level B1. In Speaking at Workplace, students learn the ability to speak in a work-related context equivalent to CEFR level B2. In Speaking for Academic Purposes, students learn speaking skills equivalent to CEFR level C1. In the course syllabi designed, diagnostic tests for CEFR levels will be conducted at the beginning and at the end of learning to determine the progress of students' speaking skills.

The course syllabi were developed based on a project allowing students to apply all materials learnt.

The learning process and skill rehearsal must be carried out concurrently according to the learning materials. Therefore, the project given must be a reinforcement of the mastery of the skills learned so that the project carried out continuously is able to strengthen students' speaking ability. Therefore, the project compiled in the course syllabi must cover all materials taught in the speaking course at a certain level.

The course syllabi contain several AI-based applications to assist in project completion.

Using technology to create meaning is one of the hallmarks of high-quality project-based learning. Therefore, AI-based technology can be a solution to assist students in project completion. By using AI, learning becomes more interesting, effective, efficient, and student-centered. In addition, the utilization of AI-based applications in speaking skills can expose students to authentic language use.

The course syllabi allow students to do regular speaking rehearsals.

One of the keys to improving speaking skills is regular practice. Therefore, the project-based course syllabi must ensure that the project can increase students' learning hours outside the classroom and students' speaking practice. Thus, students' speaking skills will also be enhanced.

The Course Syllabi Development Process

At this stage, the results of the preliminary study were used as a reference to start developing the product. The following is a description of each stage:

Determining the CEFR levels

Based on the data obtained, the CEFR levels for each speaking course are different, namely Level B1 for Speaking for Daily Purposes, B2 for Speaking at Workplace, and C1 for Speaking for Academic Purposes. The three levels represent different English language skills. Level B1 represents English proficiency sufficient to interact in topics about family or other topics familiar to students. Level B2 represents English language skills used for various purposes in the world of work. Level C1 represents English language skills in the academic world.

Determining the materials

In line with the CEFR proficiency levels determined previously, the determination of the material for each course syllabus is also adjusted to each level. The materials for the Speaking for Daily Purposes course include: (1) greetings, introductions of self and others, and goodbyes; (2) expressions to share opinions, likes, and dislikes; (3) expressions to describe daily routines; (4) expressions to describe people, places, and objects; (5) expressions to express wants and needs; expressions to describe future events; and (7) expressions to describe an event in the past.

The materials for the Speaking at Workplace course include several language functions used at workplace. These include: (1) expressions to start a conversation; (2) expressions to talk about work; (3) expressions to make a phone call; (4) expressions to confirm or rearrange an appointment; (6) expressions to make and resolve complaints over the phone; (7) expressions used in face-to-face meetings; and (8) expressions to present a product.

The materials for Speaking for academic purposes include several language functions used for academic purposes. These linguistic functions include: (1) expressions to conduct group discussions; (2) expressions to interrupt and ask for clarification; (3) expressions to define concepts and give examples; (4) expressions to compare and contrast; (5) expressions to agree and disagree; (6) expressions to give explanations; (7) expressions to read tables and graphs; and (8) expressions to make academic presentations.

Designing the project

At this stage, the project design for each speaking course was made. Each of the speaking courses has a different project. The project in Speaking for Daily Purposes is creating digital storytelling. Students are asked to work in groups and answer a driving question about what they will do to promote local tourist attractions in their city. Students are asked to conduct exploration and investigation according to the PBL stages. The product in this course is digital storytelling. The project for Speaking at Workplace is creating a video to promote a product. Students are asked to work in groups and answer a driving question about what they will do to promote their company's products. Students are asked to do exploration and investigation according to the PBL stages. The product in this course is a product presentation video. The project for Speaking for Academic Purposes is creating a video simulating a presentation of a certain research topic. Students are asked to work in groups and answer a driving question about how they present academic research. Students are asked to do exploration and investigation according to the PBL stages. The product in this course is an academic presentation video.

Determining AI used to complete the project

Based on the designed project, researchers selected 5 AI-based applications that can be used as tools to complete the project. The following is the description of each AI-based application selected.

The first application is Grammarly. Grammarly is an AI-based website that helps users to improve the quality of their writing. Grammarly will review user's writing related to spelling, grammar, use of punctuation, clarity, and errors in conveying ideas and provide suggestions for correcting these errors. Grammarly can be accessed at <https://www.grammarly.com/>. In this PBL, Grammarly will be used as a tool to check the accuracy of the script developed by students.

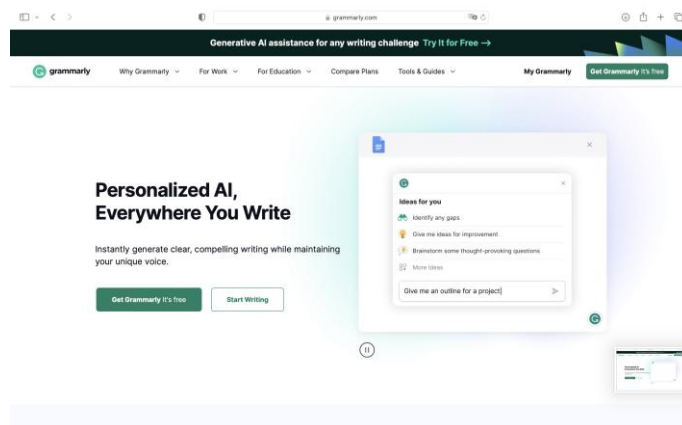


Figure 1. Grammarly Homepage

The second application is NaturalReader. This AI-based application converts English text into voice. NaturalReader features allows the AI to read text from books, PDF documents, or web pages containing texts. One of the advantages of this application for students is that they can learn the pronunciation of English words. NaturalReader can be accessed at <https://www.naturalreaders.com>. In this PBL NaturalReader will be used as a tool to improve students' English pronunciation skills by uploading student-developed scripts to NaturalReader and imitating the English pronunciation.

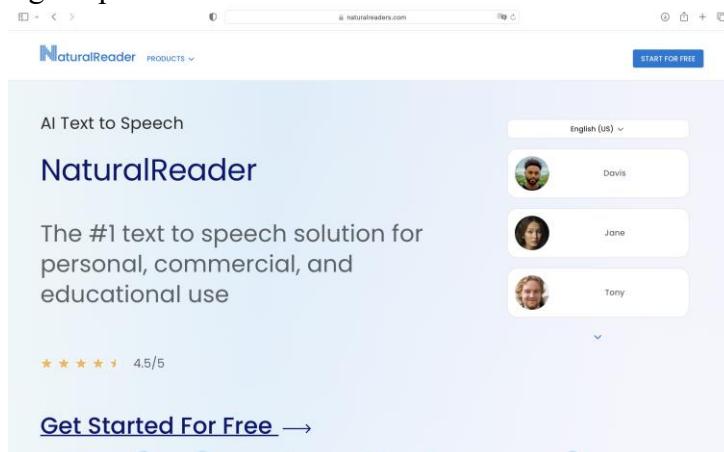


Figure 2. NaturalReader Homepage

The third AI-based application is EzBot. This chatbot assists students to learn how to make presentations in English. The menu in Ezbot allows students to learn the parts of a presentation, expressions used in presentations, examples of the use of these expressions, and questions about presentations. Ezbot can be accessed at <https://app.smojo.org/listizie/eZbot>. In this project-based learning, Ezbot will be used as a tool to improve students' ability to make presentations in English.

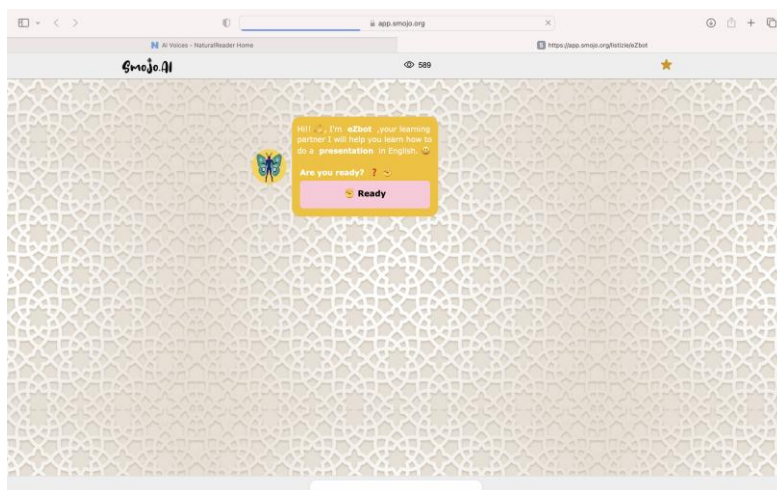


Figure 3. EzBot Homepage

Next, Paperrater is an AI-based website provides grammar checker, plagiarism checker, and proofreading features on papers and essays and provides automatic scores for each writing component. Paperrater can be accessed at <https://www.paperrater.com>. In this PBL, Paperrater will be used as a tool to check the accuracy of the script made by students.



Figure 4. Paperrater Homepage

The last application, Filmora, is a software used to create and edit videos. Filmora offers several AI-based features including AI copilot editing, AI text-based editing, AI music generator, AI image, AI copywriting, and others. Filmora can be accessed at <https://filmora.wondershare.com/index-a.html>. Since all products in this PBL are digital, students will use Filmora to create and edit the videos.



Figure 5. Filmora Homepage

Course syllabi development

Following the obtaining of all the course syllabi' characteristics, the project design was made, an AI-based application was chosen, and the course syllabi were developed by combining the PBL with AI. At this stage, three sequential speaking course syllabi were produced.

The first course syllabus developed was the course syllabus for Speaking for Daily Purposes. The project for this course is digital storytelling. The course syllabus Speaking at Workplace featured the project to create a product presentation video. Finally, the course syllabi for Speaking for Academic Purposes assigned students to create a video presentation of academic research. All course syllabi created are accompanied by several project documents, including weekly planning sheets, product summaries, and project guidelines. They also provide tutorials for using AI-based apps to help students complete the projects.

Product Validation Results

In the product validation stage, the developed course syllabi were validated by two experts, namely an AI expert and a PBL and Speaking expert. Validator 1 is an expert with expertise in English Language Teaching, Teacher Education, Digital Material Development, and ICT in Education. Validator 1 assessed the feasibility of the developed course syllabi in the field of AI. Validator 2 is an expert with expertise in Higher Education, TEFL, listening skills, and speaking skills. Validator 2 assessed the course syllabi's feasibility in the field of PBL and Speaking. The validation results showed that the course syllabi developed were very good. The results of validation are summarized in Table 1 below.

Table 1. Results of expert validation

No	Course syllabi	Score from Validator 1	Score from Validator 2
1.	Speaking for Daily Purposes	90	79.7
2.	Speaking at Workplace	91	79.7
3.	Speaking for Academic Purposes	89	79.7

Table 1 illustrates the results of expert validation of the developed course syllabi. AI expert validation gave product feasibility scores of 90, 91, and 89 for the three developed course syllabi respectively. The PBL and Speaking expert validation gave the same product feasibility score for the three developed course syllabi, namely 79.7. Both validation results fall into the "Very Good" category. This indicates that the course syllabi produced is very feasible to use. The AI validator stated that the developed course syllabi were suitable for use without revisions. The AI expert validator gave the following statements:

"The designed course syllabi are good, and the AI apps used are quite varied according to their use. Due to the rapid development of AI, it is necessary to always update its development for the future" (V1, Validation Sheet 1).

Meanwhile, the PBL and Speaking validator stated that the developed course syllabi were suitable for use with revisions. The validator provided some suggestions to improve the syllabi. The suggestions from Validator 2 and the revisions made by the researchers are outlined in the following table.

Table 2. Course syllabi revisions based on suggestions from the PBL and speaking validator

No.	Validator's comments	Revisions
1.	The sequence of materials has not been appropriate yet.	The changes of material sequences in each course.
2.	Projects only cover one material.	<ul style="list-style-type: none"> • Project changes by covering the entire materials in each course • Changes in project types for each course
3.	Adjustment on project guidelines is needed.	Adjustment on project guidelines to new project type changes
4.	Assignments have not led to project completion.	Assignments as one project completion components

Table 4 describes the revisions made on the course syllabi. Changes in the sequence of materials were made by paying attention to the level of difficulty of the material and the skills that must be mastered first. For example, in Speaking for Daily Purposes, the material on describing people, places, and objects must be mastered first before the material on telling past stories. Changes in the projects for each course were made by ensuring that the projects serve as reinforcement for students' speaking skills. Therefore, the type of projects must cover the entire materials given in one semester in each course. The project for Speaking for Daily Purposes did not change, which is still digital storytelling covering the entire materials. The project for Speaking at Workplace was changed to making a video series including five scenarios that must be completed by students in groups. The project for Speaking for Academic Purposes was also changed into making an academic presentation video with various roles that students must perform in it. With the changes in the project type, the project guidelines and

project assessment rubrics were also adjusted. Changes to the course syllabi were also made to the assignment parts. The assignments, which initially did not support the given projects, were changed to become one of the components in completing the projects. After the revisions were made, the researchers consulted the results of the revision to Validator 2. The results of the revision were approved by Validator 2. Thus, the entire course syllabi development was completed.

Discussion

In this study, three main findings were obtained. These findings include the characteristics of the developed course syllabi, the course syllabi development process, and the results of expert validation of the developed course syllabi.

The first finding is related to the four characteristics of the developed course syllabi. The first characteristic is the course syllabi development based on CEFR levels. The three sequential Speaking courses were organized based on three different CEFR proficiency levels, namely B1, B2, and C2. Iskandar et al. (2021) also used the CEFR to design test specifications for English listening skills for undergraduate English programs. The test specifications were made based on CEFR levels from A1-C1. Similar research was conducted by Phaisannan, Charttrakul, and Damnet (2019), who designed a peer interview task with a CEFR-based Task-Based learning program. The results show that the program was able to increase students' use of English and they were able to achieve the communication objectives in the interview. Second, the course syllabi are developed based on projects that allow students to apply all the materials learned. Aristidou (2020) said that projects in PBL must be related to the materials and learning objectives and the concepts in the material taught must be in the project. Third, the course syllabi contain some AI-based applications to assist in project completion. AI can support collaborative project-based learning (Luckin & Cukurova, 2019). Fourth, the course syllabi allow students to do speaking rehearsals regularly. Similarly, the research results of Frisby, Kaufmann, Vallade, Frey & Martin (2020) show that the use of virtual reality for speaking practice was able to increase students' efficacy for public speaking in five areas including: readiness, realism, self-awareness, feedback, and comfort level. Kazemi & Moradi (2019) also claimed that speaking practice significantly improved students' speaking accuracy.

The second finding is related to the course syllabi development process. The course syllabi development process included the process of determining the CEFR level, determining the materials, designing the projects, determining the AI used to complete the projects, and developing the course syllabi. Similar findings resulted by research conducted by Helyanti et al. (2022), Meilani (2022), and Inayah (2023), who developed digital literacy resources. Their development stage included steps to determine the diagnostic test to measure students' CEFR levels, analyze learning materials compatible to CEFR levels, and develop digital literacy resources based on CEFR levels.

The third finding is related to the results of expert validation which shows that the developed course syllabi were very feasible to use. The validators believed the developed course syllabi were good and used varied AI to support the project. The development of RPS by implementing AI in project-based learning can improve students' critical thinking skills and creativity, as well as being able to make students more active in learning and improve students' digital literacy. In line with this, the results of Firdaus' & Septiady's (2023) show that PBL significantly improves students' speaking ability, builds students' skills to work in teams, improves students' skills in solving problems, and encourages students to be active, communicative, creative, and innovative. The research results of Eliyasni, Kenedi, and Sayer (2019) also mentioned that blended learning and PBL can improve students' HOTS. Research

by Madhavi, Sivapurapu, Koppula, Rani, & Sreehari (2023) shows a significant improvement in students' communication skills with the use of technology and AI for language teaching and learning. Additionally, one of the AI applications used in the course syllabi is a chatbot. Hapsari & Wu (2022) stated that conversations with AI chatbots will reduce speaking anxiety, increase learning comfort, and improve students' critical thinking skills.

CONCLUSION

Based on the findings and discussion that have been presented, three main conclusions can be drawn. First, the sequential speaking courses developed by implementing AI in PBL method must cover four main characteristics including the development of the course syllabus based on the CEFR levels, the project covering all learned materials, and the use of AI tools for project completion, and the possibility to improve speaking rehearsals. Second, the product development stage includes determining the CEFR levels, determining the materials, designing projects, determining AI tools for project completion, and developing the course syllabi. Third, the developed course syllabi were found to be highly viable for application based on the validation results by two experts. The limitation of this research is that it only reached the product validation stage. This research is not yet at the stage of product trials and product dissemination and implementation. Therefore, other researchers are recommended to be able to move the study past the product validation stage. Comprehensive product trials can yield important information on the practicality, efficacy, and possible drawbacks of the suggested product. In addition, product dissemination and implementation should be carried out. Thus, the comprehension of the product's feasibility can be strengthened and its potential influences in practical settings can be enhanced.

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