

Integrating Digital Technology into Project-Based Learning: Its Impact on Speaking Performance¹

Mariana Ulfah Hoesny², Politeknik Negeri Malang, Malang, East Java, Indonesia

Punaji Setyosari³, Henry Praherdhiono⁴, Nunung Suryati⁵, Universitas Negeri Malang, Malang, East Java, Indonesia

Abstract

This research is aimed at investigating the implementation of project-based learning (PBL) using a voice recorder, Orai application, and web as material sources. It is conducted to determine the impact of combining PBL and digital tools on speaking performance. The participants were 80 students who took English subject in State Polytechnic of Malang, Electronic Engineering study program. Five aspects of speaking performance were observed to determine which ones are affected by the strategy. The research methodology employed was quasi-experimental with pre-test and post-test. Participants were selected via random sampling. The research sample consisted of two classes with the total sample of 80 students. Data analysis was done through hypothesis testing of the speaking performance data. The results showed that infusing digital technology into project-based learning can significantly improve speaking performance in the aspects of grammar, comprehension, and vocabulary, but does not significantly affect the fluency and pronunciation aspects. Advice and recommendations to the faculty and teacher candidates were discussed further.

Resumen

Esta investigación tiene como objetivo investigar la implementación del aprendizaje basado en proyectos (ABP) utilizando una grabadora de voz, la aplicación Orai y la web como fuentes materiales. Se lleva a cabo para determinar el impacto de la combinación de ABP y herramientas digitales en el rendimiento oral. Los participantes fueron 80 estudiantes que tomaron la materia de inglés en el programa de estudios de Ingeniería Electrónica del Politécnico Estatal de Malang. Se observaron cinco aspectos del desempeño del habla para determinar cuáles se ven afectados por la estrategia. La metodología de investigación empleada fue cuasiexperimental con pretest y postest. Los participantes fueron seleccionados mediante muestreo aleatorio. La muestra de la investigación estuvo compuesta por dos clases con una muestra total de 80 estudiantes. El análisis de los datos se realizó mediante pruebas de hipótesis de los datos de rendimiento oral. Los resultados mostraron que incorporar tecnología digital en el aprendizaje basado en proyectos puede mejorar significativamente el rendimiento oral en los aspectos de gramática, comprensión y vocabulario, pero no afecta significativamente los aspectos de fluidez y pronunciación. Se discutieron más a fondo los consejos y recomendaciones para los profesores y candidatos a profesores.

Introduction

Technological advancement

Integrating technology into teaching and learning has become a primary need. The technologies also cover information and communication technology (ICT) which refers to technologies that provide access to information via communication (Ratheeswari, 2018). Technologies make learning environment more encouraging and active since they develop student-teacher connections as well as provide engaging teaching aids (Sabiri, 2020). In addition, they have become one of the important drivers in language and social life terms (Vo & Pham, 2021). These tendencies are in accordance with the emergence of industrial revolution 4.0 (IR 4.0)⁶ marked by the industrial transformation manufacturing through digitalization and the potential new technologies exploitation (Rojko, 2017). In IR 4.0 era manufacturing sectors depend more on networked system which allows overall change in products, procedures and services (Halili et al., 2020; Tay, 2018). Therefore, digitalization in industries, education, and workplaces cannot be avoided. The impact of technology began with the third industrial revolution, characterized by the use of computer and web-based interconnections, especially in education. Therefore, education in IR 4.0 should be developed based on technology invented in the third industrial revolution, such as hybrid online, in-person instruction, efficient integration and seamless global video conference, and asynchronous education variety of sources (Penprase, 2018). Technological advancement caused by IR 4.0, combined with theories of constructivist learning

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² marianahoesny99@gmail.com, 0000-0002-1335-1622, Correspondent.

³ punaji.setyosari.fip@um.ac.id, 0000-0003-0187-9785

⁴ henry.praherdhiono.fip@um.ac.id, 0000-0002-5922-7491

⁵ nunung.suryati.fs@um.ac.id, 0000-0002-4672-2952

⁶ The term IR 4.0 is related to the advance of emergence of the new industrial revolution due to digital technology. The use of the Orai application that is used in this research is one of the results of these new tendencies.

concepts, emphasizes the role of students in constructing knowledge (Slavin, 2017) and has shifted teaching and learning to be more dynamic. Furthermore, the economic development mainly targeting the digital side has pushed universities to provide students with not only knowledge but also skills to match the global-job demand market (Menglin, 2021). Therefore, combining constructivist ideas in learning terms with technology offers innovative value to provide students with skills such as collaboration, creativity, communication, and critical thinking, which is implied through implementing project-based learning (PBL) enriched with the technology infusion (Chen, 2018).

Project-based learning

PBL is an approach to learning which reflects the constructivist ideas proposed by John Dewey (Jumaat, 2017). It is believed that learning is a natural process happening through interaction and experience-idea reflection among learners (Dewey, 1938). The notion of PBL has been inserted in several fields in education (Maher & Yoo, 2017; Nguyen, 2017; Pereira et al., 2022; Thuan, 2018; Ysuf, 2021; Yuliansyah & Ayu, 2021). In the vocational education context, PBL has proved to develop practical and research skills, and values and attitudes, and to promote integrated understanding of knowledge and concepts, facilitate interdisciplinary work and improve motivation (Vázquez Vargas, 2018; Xie, 2016). In addition, PBL was also reported to generate essential skills, thinking ability and personal qualities (Bell, 2010). Thus, it can be concluded that it is a comprehensive learning approach since it comprises both academic and non-academic skills (Sudjimat et al., 2021). In regard to technology advancement, combining PBL with the technology application has been viewed as a significant learning innovation (Safaruddin et al., 2020). Inserting its learning-related values such as interaction and cooperation through the web-based implementation learning system matches the learner's characters in the 21st century (Chatwattana & Nilsook, 2017). PBL is proven to be learner-centered since it encourages students to achieve inquiry skills. It allows students to create products, presentations, and performances in which technology can be used to assist as well as enrich the end target. Therefore, it helps improve the learners' perception and attitude towards technology, as well as improves other skills such as thinking, communication, and creativity which support knowledge (Piltan et al., 2017).

The speaking skill

Regarding communication skills, especially in English, speaking plays an essential role both in social life and related to the job world. It is said to be vital to master mainly to face the global economic market (Clement, 2018; Durga, 2018). At corporations and organizations, speaking English is essential since it is used to communicate in workplace environments (John et al., 2021). It is vital then to pay more attention to improving speaking mainly for vocational students since they must be prepared to work after graduating.

Unfortunately, English learners frequently encounter problems related to socio-psychological, socio-economic, linguistic and other based on teaching situations and environmental problems due to the lack of meaningful context they have with which to practice (Keirstead et al., 2016; Salameh & Sathakathulla, 2018; Shen & Chiu, 2019). In reference to this, an innovative strategy to teach speaking needs to be developed. The strategy should provide context which is similar to real world situations and increase the exposure to English.

Digital technology

PBL infused with digital technology is important because the environment of PBL encourages students to deal with real world tasks, improve learner autonomy, motivation, engagement, and promote language use for real-life purposes (Chen, 2019; Mamakou & Grigoriadou, 2010; Nhu & Minh, 2019). In terms of speaking, it supports student-student and teacher-student interaction (Razali et al., 2020) which involves discussion that is recognized as authentic communication (Gudu, 2015). In addition, technology integration provides various resources both to practice and develop speaking performance, that can help learners complete their projects (Hursen, 2018). Internet-based technology is becoming an integral part of the teaching / learning process which has inspired teachers to find innovative ways in teaching (Richards, 2015).

Moreover, the use of technological tools such as voice recorders, applications like Orai, and video have been proved to support the teaching/ learning of speaking skills (Le, 2018; Wicaksono, 2018). Orai is a mobile application to practice speaking autonomously. This application has a voice recording feature which can give feedback on pace, energy, conciseness, and the use of fillers (Halimah et al., 2018). This application has been shown to improve learners' speaking fluency and engagement during speaking practice (Halimah et al., 2018). It also gives feedback regarding learners' clarity and use of pauses and fillers which learners have found to be helpful (Saripudin, 2020). Simatupang et al., (2019) added that the use of Orai can increase learner confidence in speaking. Technology integrated into PBL contributes towards academic

performance (Al-Abdullatif et al., 2021) which also impacts language teaching, especially speaking skills (Chen, 2018; Farrel & Vos, 2018; Mamakou & Grigoriadou, 2010).

Combining PBL with technology can be a good idea since the tools provided by technology can help the implementation of the project. PBL provides meaningful context, encourages students to develop communication skills, especially speaking, and practice the content knowledge (Kovalyova et al., 2016; Mamakou & Grigoriadou, 2010;). Technology integration accompanies the values promoted by PBL because it is contextual, adaptable, easy to use, innovative, and interactive (Neira et al., 2017). Therefore, it is instrumental to implement projects with the technology assistance to improve speaking skills, as well as to prepare the future workforce with skills demanded by the industrial world revolution such as collaboration, critical thinking, problem solving, and technological ability (Sari et al., 2020; Thuan, 2017).

In reference to the background the following research question is formulated:

What is the effect of PBL infused with digital technology on the aspects of speaking performance?

Literature Review

English language teaching: Speaking and the integration of technology

Speaking is said to be one of the important skills since it is pivotal in English proficiency as well as to develop effective communication (Abugohar et al., 2020; Tridinanti, 2018). However, it is frequently not taught explicitly in the classroom, since teaching and learning English is more focused on teaching the test, textbook, and written language (Tridinanti, 2018). Moreover, many factors impact the speaking skill and the teaching of this skill, such as the quality of the textbook, students' willingness to communicate, their opportunities to practice and listen to correct English pronunciation, the teachers' negative attitude and teaching approach, classroom management, L1 interference, and psychological barriers like anxiety, motivation, shyness, fear of making mistakes and self-confidence (Aldaghri, 2018; Al-Eiadeh et al., 2016; Bao & Liu, 2021; Fernández-García & Fonseca-Mora, 2019). Other problems are connected with the aspects that build speaking like pronunciation, vocabulary, grammar, and fluency (Fontiveros-Malana, 2019; Manurung & Izar, 2019).

Referring to this issue, integrating technology into the English teaching, mainly speaking, is believed to have a positive impact. The digital technology utilization in language classroom cannot work well without teacher and student participation. Digital technology in the form of audio voice recorders, video presentations, online dictionaries, and high-speed internet not only facilitate learning, but also provide space to practice the knowledge that has been learned (Amelia & Komariah, 2017). In addition, implementing video as a product in teaching English has been reported to improve students' motivation which finally affects their English (Candraloka & Rosdiana, 2019). In spite of frustration due to technical difficulties during the process of finishing video, the study mentioned the students' positive attitude toward the integration digital technology in their language classroom. Employing computer mediated activities to practice speaking was also beneficial for students whose parents lacked sufficient English skills. Audio-visual practice serving as medium to practice speaking and improve learners' willingness to communicate also eventually impacted speaking (Abbasova & Mammadova, 2019). Besides making improvements in speaking, the digital assistance technology could act as space to practice outside the classroom. Exposure which was given to spoken language was proven to enhance learners' speaking skill, even though aspects like fluency and accuracy were not significantly affected (Jung, 2021). Video conferencing, social media interaction, vlogs, *YouTube*, digital story telling websites, and some applications like *EnglishFeed*, *SpeakingPal Tutor*, *Clear Speech*, and *Learn English Audio and Video* were also reported to influence speaking skills (Buckingham & Alpaslan, 2017; Hsu, 2016; Sosas, 2021). Those digital tools promoted the speaking practice which complemented speaking teaching in classroom. They increased engagement since learners could take part without time and place constraints, reduce anxiety, and boost motivation (Marzuki, 2018).

PBL and technology integration

PBL drives students to incorporate both language skills and content knowledge during the implementation since the project requires them to do information gathering and analysis and also create end products. Those activities connect knowledge about content and language skills (Stoller, 2002). The process that occurs along the development of the project allows students to use other skills such as critical thinking, problem solving collaboration and communication. Therefore, some studies regarding the application of PBL in the context of English as a foreign language (EFL), English as a second language (ESL) or English for special purposes (ESP) has been reported to be successful (Cong-Lem, 2018; Haines, 1989; Sari et al., 2020).

In a classroom setting, students' participation and engagement in speaking activities depend on individual and classroom-oriented factors. Individual factors refer to a lack of prior knowledge regarding the topic, limited L2 speaking experience, and fear of negative evaluation. While classroom-oriented factors are reflected through routine task sequence, class time, class size, and teaching technique (Pham, 2018). Riasati and Rahimi (2018) also reported this finding in investigating individual and situational factors in speaking. The individual factors found were connected to learners' personality, self-confidence, opportunity to speak and fear of evaluation, and correctness in their speaking. In addition, situational factors were related to the classroom situation, including teachers, task type, and seating location. The study by Riasati and Rahimi (2018) also showed that learners felt more comfortable when they speak in groups, pairs or in a discussion which matched the atmosphere in a PBL setting. In a PBL setting, authenticity is an advantage. It represents a real-world context, tasks and tools, quality standard, effects gained by learning, learners' personal concerns, as well as life issues (Richards & Renandya, 2002). PBL also presents steps which lead the learners to accomplish the tasks. Those steps involve agreeing, determining and structuring the project, gathering, compiling, and analyzing information, presenting the project, and evaluating as the final step (Stoller, 2002). The first three steps are aimed to provide students with an understanding about the project as well as to motivate them. The next three steps –gathering, compiling, and analyzing information are development of the project. Finally, the final two steps are for evaluation (Jalinus et al., 2017)

PBL technology also plays a pivotal role in terms of knowledge and information sharing, and enriching the learning environment (Kelsen, 2018). Technology has been shown to promote mutual interaction and encourage collaboration as well as communication (Aslan & A!ahin, 2020). Moreover, it bridges student-student and teacher-student interaction, increases motivation towards autonomous learning, and makes it easier for students to be active (Harris, 2018). Technology, integrated into a PBL environment, not only provides learners with English proficiency skills, but also enables learners to acquire technological skills such as video editing (Candraloka & Rosdiana, 2019) and other skills related to language learning. Combining technology with PBL has been reported to optimize higher-order thinking and problem-solving skills. In addition, technology can provide means for learners to use language for real-life purposes (Mamakou & Grigoriadou, 2010). Technology together with PBL also impacts learners' engagement which eventually improves their academic performance (Al-Abdullatif et al., 2021).

Methodology

Research design

The present study is a quasi-experimental study with a non-equal control group design. Participants involved were divided into the experimental and the control groups. The experimental group and the control group first received a pretest. The experimental group received a learning treatment using a PBL assisted by Orai, while the control group received a treatment using project assisted by voice recorder. Both Orai and the voice recorder were used to practice speaking since the product of project was describing and presenting the procedures of how to use electronic objects via podcast. The experimental group received speaking practice using Orai three times because the free trial version is limited three times. After trial version, users have to pay to keep using Orai. The conventional treatment implemented PBL without the assistance of Orai application for speaking practice. On the other hand, they only used voice recorder which did not give feedback as Orai did. The experimental group and the control group were given a post-test to see the treatment effect in the experimental group. The implementation of PBL was based on the steps proposed by Stoller (2002). The steps were specific for project based language learning, thus every step is accompanied with preparation for language demands. The project conducted by students was to make video presenting procedures to operate an electronic home appliance.

Participants

The participants in this study consisted of 80 Diploma IV students from the Electronic Engineering study program who took English class in a state polytechnic based in Malang, East Java, Indonesia. They consisted of 17 females and 63 males. In most engineering study programs, males outnumber females, therefore the number of male students was more than female students. The permission for conducting research was obtained from the head of study program. A formal letter explaining the research was sent to gain research approval. In addition, oral consent with the participants was obtained by Zoom meeting as the media used during the implementation of strategy. The participants were selected using random samples technique. The samples were taken at random from four classes. The research design is shown in Table 1.

Group	Pretest	Treatment	Post-test
Experimental Class	O ₁	X	O ₂
Control Class	O ₃	-	O ₄

(Note: O₁= Early ability of Experimental Class, O₂= Later ability of Experimental Class, O₃= Early ability of control class, O₄= Later ability of control class, X= Treatment for Experimental Class)

Table 1: Research design

Data collection procedure

The data collection techniques used in this study were pre-test and post-test. The research tool used by the researcher was a speaking skill test and an assessment rubric. The speaking test was adapted from TOEIC trial test which had ten items. The TOEIC trial test was selected since it was an official test used to measure the English proficiency of new students and those who were going to graduate from the Politeknik Negeri Malang. The items were reading a text aloud, describing a picture, responding to questions, responding to questions based on information provided, and describing an electronic object including how the object was operated. The data collected were students' voices which were transcribed. The transcription was then assessed based on a speaking assessment rubric adopted from TOEIC. The assessment of the transcript was done by the teacher and the researcher to avoid bias. The transcription was required to see if the students were using the five aspects of interest which were fluency, comprehension, vocabulary, pronunciation, and grammar. All test questions passed the validity test both statistically and by expert review. The reliability tests result show that the elements used in the speaking skills test had a high-reliability index of 0.962. This corresponds to the alpha criterion from Cronbach (1984), which is classified with a reliability index, the value of which is 0.90 to 1.00 is very high; 0.70-0.89 high value; 0.30-0.69 is moderate, and 0.00-0.30 is low. Thus, it can be concluded that the test was reliable to be used in measuring students' speaking skill.

Data analysis

The data analysis technique used in this study was the prerequisite test and the hypothesis test. The prerequisite test used consisted of the normality test and the homogeneity test. The normality test was performed to determine whether the research data obtained was normally distributed or not. This normality test was analyzed using the Kolmogorov-Smirnov test with the help of SPSS version 23. The homogeneity test was needed to determine whether the population and sample used in the study were homogeneous or not. After performing the prerequisite test, the ANCOVA statistical hypothesis test can be carried out to test the study hypotheses.

Results

Before testing the hypothesis, the data were analyzed with the Kolmogorov-Smirnov test with a sample and the Levene test for the homogeneity of equal error variances. The test results show that all data are not normally distributed and homogeneous. The data used in this study were obtained from the pre-test and post-test results.

Data Group	Class	Kolmogorov-Smirnov ²		
		Statistic	df	Sig.
Fluency Pretest	Control class	0.338	40	0.000
	Experiment class	0.151	40	0.022
Fluency post-test	Control class	0.332	40	0.000
	Experiment class	0.266	40	0.000
Grammar Pretest	Control class	0.242	40	0.000
	Experiment class	0.181	40	0.002
Grammar Post-test	Control class	0.280	40	0.000
	Experiment class	0.195	40	0.001
Vocabulary pretest	Control class	0.286	40	0.000
	Experiment class	0.175	40	0.004
Vocabulary _post-test	Control class	0.332	40	0.000
	Experiment class	0.250	40	0.000
Pronunciation _pretest	Control class	0.173	40	0.004
	Experiment class	0.204	40	0.000
Pronunciation _post-test	Control class	0.264	40	0.000
	Experiment class	0.222	40	0.000
Comprehension _pretest	Control class	0.300	40	0.000
	Experiment class	0.174	40	0.004
Comprehension _post-test	Control class	0.292	40	0.000
	Experiment class	0.166	40	0.007

Table 2: Summary of all normality testing

	Levene Statistic	df1	df2	Sig.
Fluency Pretest	6.472	1	78	0.013
Fluency_post-test	3.681	1	78	0.059
Grammar Pretest	1.071	1	78	0.304
Grammar Post-test	6.723	1	78	0.011
Vocabulary pretest	1.675	1	78	0.199
Vocabulary _post-test	0.776	1	78	0.381
Pronunciation_pretest	5.467	1	78	0.022
Pronunciation_post-test	7.805	1	78	0.007
Comprehension pretest	2.746	1	78	0.101
Comprehension post-test	2.063	1	78	0.155

Table 3: Summary of all homogeneity testing

Table 4 presents the summary of result regarding the effects of PBL assisted with Orai application towards the aspects of speaking namely grammar, vocabulary, comprehension, fluency and pronunciation.

No.	Variable	Mean Square	Sig. value
1	Grammar	12.013	0.002
2	Vocabulary	11.172	0.007
3	Comprehension	6.603	0.032
4	Fluency	5.583	0.072
5	Pronunciation	2.451	0.226
	Total	190.130	0.000

* Significant at the level 5%

Table 4: Test results on the effect of PBL assisted by technology toward speaking

The study results in Table 4 show that using PBL assisted by technology has an impact toward grammar, vocabulary, and comprehension aspect, but does not significantly affect the fluency and pronunciation aspect. Significance values gained for fluency and pronunciation were higher than 0.05. It indicated that PBL combined with digital technology did not impact the two aspects substantially.

Discussion

The research results suggested that PBL integrated with digital technology can improve speaking performance in general. However, further analysis showed that PBL integrated with digital technology could significantly improve speaking in the grammar, vocabulary, and comprehension aspects, while fluency and pronunciation were not significantly influenced. Furthermore, the integration of technology was required to give students more opportunities to practice outside the classroom.

These results provide evidence that technology can reinforce learning, especially language learning. The use of Orai provided opportunities for students to practice speaking outside classrooms. Orai also acted as a personal speaking coach that could also give feedback regarding students' speaking. The trial version of Orai application suggested plans for users to use to improve selected aspects of speaking. This feature not only could improve students' speaking skill, but also encourage them to be autonomous learners. This is in line with the study conducted by (Halimah, et al., (2018); Sabri (2018) and Simatupang, et al., (2019).

This study also indicates there could be a positive impact towards the learning environment created with the integration of technology into project based learning. PBL provides students with a meaningful context since it supplies problems similar to those in the real word. In PBL setting, students are required to create products and work with teams. Adding technological tools in the PBL atmosphere facilitates students' interaction during the accomplishment of project and adding more values to teaching. Technology supported by the internet give abundant teaching sources audio, video, and text. These sources can inspire teachers to be more innovative in teaching. Hamad and Metwally (2019) supported the notion concerning technology equipped learning which was said to promote students' interaction and enhanced teaching.

The findings of this study show that fluency and pronunciation were not significantly influenced by PBL implementation integrated with digital technology. In terms of fluency, the lack of influence may be caused by affective factors such as fear of making mistakes, a lack of self-confidence, and anxiety. These are aligned with the study conducted by Ngoc and Dung (2020) that reported about the effects of these factors caused approximately 60% to 85% towards students' speaking problems. Moreover, other factors like frequency of

input, exposure, individual differences, and teachers affect fluency (Putri, et al., 2019; Triwittayayon & Sarobol, 2015). The factors are connected to the atmosphere in Indonesia. Learners may have difficulties getting exposed to English since they are surrounded by people who do not speak English. In addition, most learners speak not only Bahasa Indonesia, but also Javanese, Sundanese, Madurese, and other mother tongues. In terms of teachers and individual differences, these factors might lead to innovative ways to create activities for the class. Individual differences refer to learning preferences which should be accommodated by teachers to increase participation in the classroom (Putri et al., 2019).

The findings related to a lack of influence on pronunciation are aligned with the study conducted by Purba (2018). Exposure was one of factors influencing pronunciation. This can be connected with frequency of input which also affects fluency. People and environment which surround students do not motivate to learn English since they do not speak English often. People here refer to family and friends, while environment represents the place in which students live and study. Thus, students are not exposed to English intensively which later affects their pronunciation.

Conclusion

The present study investigated the effects of implementing project-based learning (PBL) and Orai application on students' speaking performance. The result of study showed that PBL integrated with Orai application can improve speaking in some aspects such as grammar, vocabulary and, comprehension. On the other hand, the integration of PBL and Orai cannot improve fluency and pronunciation significantly. The positive result of the study indicates that integrating technology to PBL can be used in teaching speaking since the integration impact some aspects that have been mentioned previously. This study also suggests that incorporating technology into the practice of PBL should be done as students can gain benefits in practicing speaking, especially in terms of grammar, vocabulary, and comprehension.

References

- Abbasova, M., & Mammadova, N. (2019). The role of digital technology in English language teaching in Azerbaijan. *International Journal of English Linguistics*, 9(2), 364–372. <https://doi.org/10.5539/ijel.v9n2p364>
- Abugohar, M. A., Salheen, D. A. A., Yassin, B., Saed, H. A., Yunus, K. (2020). Scaffolding oral fluency mediating the target language in ELT to tertiary-level students: A follow-up scheme. *International Journal of Instruction*, 13(4), 331-346. <https://doi.org/10.29333/iji.2020.13421a>
- Al-Abdullatif, A. M., & Gameil, A. A. (2021). The effect of digital technology integration on students' academic performance through Project-Based Learning in an E-Learning environment. *International Journal of Emerging Technology in Learning*, 16(11), 189–210. <https://doi.org/10.3991/ijet.v16i11.19421>
- Aldaghri, I. N. M. (2018). *Investigating the challenges of learning speaking skills in EFL classes: perspectives from preparatory year female students* [Unpublished master's thesis], Al-Imam Muhammad Ibn Saud Islamic University.
- Al-Eiadeh, A.-R., Al-Sobh, M. A, Al-Zoubi, S. M., & Al-Khasawneh, F. (2016). Improving English language speaking skills of Ajloun National University students. *International Journal of English and Education*, 5(3), 181–195. <https://ijee.org/assets/docs/14.19215340.pdf>
- Amelia, M., & Komariah, E. (2017). Investigating English speaking skill problems encountered by students at Islamic boarding school. *Research in English and Education*, 2(2), 119–126.
- Aslan, R., & Ālahin, M. (2020). 'I feel like I go blank': Identifying the factors affecting classroom participation in an oral communication course. *Teflin Journal*, 31(1), 19–43. <https://doi.org/10.15639/teflinjournal.v31i1/19-43>
- Bao, Y., & Liu, S. (2021). The influence of affective factors in second language acquisition on foreign language teaching. *Open Journal of Social Sciences*, 9(3), 463-470. <https://doi.org/10.4236/jss.2021.93030>
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *A Journal of Educational Strategies, Issues and Ideas*, 83(2), 39–43. <https://doi.org/10.1080/00098650903505415>
- Buckingham, L., & Alpaslan, R. S. (2017). Promoting speaking proficiency and willingness to communicate in Turkish young learners of English through asynchronous computer-mediated practice. *System*, 65, 25–37. <https://doi.org/10.1016/j.system.2016.12.016>
- Candraloka, O., R., & Rosdiana, A. (2019). Investigating problems and difficulties of speaking that encounter English language speaking students of junior high school. *Journal of English Language and Education*, 5(2), 130–135 <https://doi.org/10.26486/jele.v5i2.968>
- Chatwattana P., & Nilsook, P. (2017). A web-based learning system using project-based learning and imagineering. *iJET*, 12(5), 4–22. <https://doi.org/10.3991/ijet.v12i05.6344>
- Chen, C., W.-y. (2018). Developing EFL students' digital empathy through video production. *System*, 77, 50–57. <https://doi.org/10.1016/j.system.2018.01.006>
- Chen, J. C. (2019). Designing online project-based learning instruction for EFL learners: A webquest approach. *MEXTESOL J*, 43(2). https://www.mextesol.net/journal/index.php?page=journal&id_article=8559
- Clement, A. (2018). English for the workplace: The importance of English language skills for effective performance. *The English Classroom*, 20(1), 41–50.
- Cong-Lem, N. (2018). Web-based language learning (WBLL) for enhancing L2 speaking performance: A review. *Advances in Language and Literary Studies*, 9(4), 143–152. <https://doi.org/10.7575/aiac.alls.v.9n.4p.143>

- Cronbach, L.J. (1984) *Essential of psychological testing* (4th ed.). Harper & Row
- Dewey, J. (1938). *Experience and education*. Collier.
- Durga, V. S. S. (2018). The need of English language skills for employment opportunities. *Journal for Research Scholars and Professionals of English Language Teaching*, 7(2). <http://jrspelt.com/wp-content/uploads/2018/06/Satya-Language-Skills-for-Employment.pdf>
- Farrel, T. S.C., & Vos, Rebecca. (2018). Exploring the Principles and Practices of One Teacher of L2 Speaking: The Importance of Reflecting on Practice. *Iranian Journal of Language Teaching Research*. 6(1).1-15. <http://www.reflectiveinquiry.ca/wp-content/uploads/2016/06/Farrell-Vos-2018.pdf>
- Fernández-García, A., & Fonseca-Mora, M. C. (2019). EFL learners' speaking proficiency and its connection to emotional understanding, willingness to communicate and musical experience. *Language Teaching Research*, 26(1). <https://doi.org/10.1177/1362168819891868>
- Fontiveros-Malana, M. (2019). First language interference in learning the English language. *Journal of English as an International Language*, 13(2), 32-46. <http://files.eric.ed.gov/fulltext/EJ1246973.pdf>
- Gudu, B. O. (2015). Teaching speaking skills in English language using classroom activities in secondary school level in Eldoret municipality, Kenya. *Journal of Education and Practice*, 6(35), 55-63. <https://www.iiste.org/Journals/index.php/JEP/article/view/27877/28602>
- Haines, S. (1989). *Projects for the EFL classroom: Resource material for teachers*. Nelson.
- Halimah, H., Helmie, J. & Susilawati, N. (2018). Integrating ORAI application in teaching English at senior high school. *Indonesian Journal of English Teaching*, 7(2), 110-117. <https://doi.org/10.15642/ijet2.2018.7.2.110-117>
- Halili, S. H., Sulaiman, S., Sulaiman, H., & Razak, R. (2020). Embracing industrial revolution 4.0 in universities. *IOP Conference Series, Materials Science and Engineering* (Annual Conference on Computer Science and Engineering Technology (AC2SET)), 23 September, 2020, Medan, Indonesia). <https://doi.org/10.1088/1757-899X/1088/1/012111>
- Hamad, M. M., & Metwally, A., A. (2019). Using technology towards promoting online instructional scaffolding: Literature review. *Arab World English Journal, Special Issue: The Dynamics of EFL in Saudi Arabia*. 85-95. <https://dx.doi.org/10.24093/awej/efl1.7>
- Harris, C. A. (2018). Student engagement and motivation in a project based/blended learning environment. [Doctoral dissertation, Azusa Pacific University]. ProQuest [10827819]. <https://www.proquest.com/docview/2128016289>
- Hsu, H.-C. (2016). Voice blogging and L2 speaking performance. *Computer Assisted Language Learning*, 29(5), 968-983. <https://doi.org/10.1080/09588221.2015.1113185>
- Hursen, C. (2018). The impact of Edmodo-assisted project-based learning applications on the inquiry skills and the academic achievement of prospective teachers. *TEM Journal*, 7(2), 446-455. http://www.temjournal.com/content/72/TemJournalMay2018_446_455.pdf
- Jalinus, N., Nabawi, R. A., & Mardin, A. (2017). The seven steps of project based learning model to enhance productive competence of vocational students. *Proceeding of 1st International Conference on Technology and Vocational Teachers (ICTVT 2017)*. 102. 251-256. <https://doi.org/10.2991/ictvt-17.2017.43>
- John, S., Gurario, S., & Halepota, J., A. (2021). The role of English language skills in career growth: a study of perceptions and strategies used to improve English language skills by graduate and undergraduate students of Karachi, Pakistan. *Global Social Sciences Review*, VI(1), 346-355.
- Jung, C. D. (2021). Perceptions of collaborative video projects in the language classroom: A qualitative case study. *International Journal of Instruction*, 14(4), 301-320. <https://doi.org/10.29333/iji.2021.14418a>
- Jumaat, N. F., Tasir, Z., Halim, N. D. A., Ashari, Z. M. (2017). Project-based learning from constructivism point of view. *Advanced Science Letters*, 23(8), 7904-7906. <https://doi.org/10.1166/asl.2017.9605>
- Keirstead, J., Mehta, S., Webb, S., Silveira, L., & Khikhol, H. (2016). English at work: Global analysis of language skills in the workplace. *Cambridge English Language Assessment Report*. <https://www.cambridgeenglish.org/images/english-at-work-full-report.pdf>
- Kelsen, B. (2018). Target language use and performance in project-based language learning (PBL). *The Journal of Asia TEFL*, 15(1), 199-207. <http://dx.doi.org/10.18823/asiatefl.2018.15.1.14.199>
- Kovalyova, Y. Y., Soboleva, A. V., & Kerimkulov, A. T. (2016) Project based learning in teaching communication skills in English as a foreign language to engineering students. *International Journal of Emerging Technologies in Learning*, 11(4), 153-156. <https://doi.org/10.3991/ijet.v11i04.5416>
- Le, T. (2018). Voice recording in second language outside the classroom: Process and product. *Journal of NELTA*, 23(1-2), 129-141. <https://doi.org/10.3126/nelta.v23i1-2.23357>
- Maher, D., & Yoo, J. (2017). Project based learning in the primary school classroom. In *Progress in education* (pp. 105-119).
- Mamakou, I., & Grigoriadou, M. (2010). An e-project-based approach to ESP learning in an ICT curriculum in higher education. *Themes in Science and Technology Education*, 3(1), 119-137. <https://www.learntechlib.org/p/148648>
- Manurung, Y. H., & Izar, S. L. (2019). Challenging factors affecting students' speaking performance. *Proceedings of the 2nd International Conference on Language, Literature and Education, ICLLE 2019, Padang, Indonesia*. <http://dx.doi.org/10.4108/eai.19-7-2019.2289545>
- Marzuki, M. J. (2018). The use of digital vlog media to enhance students' speaking skill [Unpublished S1 Thesis] Universitas Negeri Makassar. <http://eprints.unm.ac.id/id/eprint/15277>
- Menglin, F., Jandigulov, A., Snezhko, A., Volkov, L., Dudnik, O. (2021). New technologies in educational solutions in the field of STEM: The use of online communication services to manage teamwork in project-based learning

- activities. *International Journal of Emerging Technologies in Learning*, 16(24), 4–22.
<https://doi.org/10.3991/ijet.v16i24.25227>
- Ngoc, D. T. B., & Dung, T. T. (2020). Key factors influencing learners' oral fluency in English speaking classes: A case at a public university in Vietnam. *VNU Journal of Foreign Studies*, 36(6), 93–108. <https://doi.org/10.25073/2525-2445/vnufs.4631>
- Nguyen, T. T. (2017). Developing important life skills through project-based learning : A case study. *The Normal Lights*, 11(2), 109–142. <https://doi.org/10.56278/tnl.v11i2.529>
- Nhu, N. T., & Minh, D. D. (2019). Factors affecting English language learning processes at Thai Nguyen University. *International Journal of Scientific and Research Publications*, 9(8), 463–469.
<https://doi.org/10.29322/ijsrp.9.08.2019.p9270>
- Penprase, B. E. (2018). The fourth industrial revolution and higher education. In N. W. Gleason (Ed.), *Higher education in the era of the fourth industrial revolution* (pp. 207–229). Springer.
- Pereira, M. A. C., Ignácio, L. M. N. da C., & Rodrigues Reis, C. E., (2022). Virtualizing project-based learning: An abrupt adaptation of active learning in the first days of the Covid-19 pandemic with promising outcomes. *Sustainability*, 14(1). <https://doi.org/10.3390/su14010363>
- Pham, T. (2018) Project-based learning: From theory to EFL classroom practice. *Proceedings of the 6th International Open TESOL Conference*, 327–339.
- Pilten, P., Pilten, G., & Sahinkaya, N. (2017). The effect of ICT assisted project-based learning approach on prospective ICT integration skills of teacher candidates. *Journal of Education and Training Studies*, 5(3), 135–147.
<https://doi.org/10.11114/jets.v5i3.2051>
- Poonpon, K. (2018). Enhancing English skills through project-based learning. *The English Teacher*, 40, 1–10.
- Purba, C. N. (2018). The pronunciation problems of the English department students in the University of HKBP Nommensen. *Journal of English Teaching as a Foreign Language*, 4(1), 57–67.
<https://ejournal.uhn.ac.id/index.php/jetafl/article/view/128/255>
- Putri, M. R., Ariyani Pedo, V. A., & Pawestri, N. (2019). Analyzing the factors influencing students' fluency in English speaking skills: A case in Bina Nusantara University. *Proceedings of the 1st International Conference on Language and Language Teaching, ICLLT 2019, Magelang, Indonesia*. <https://doi.org/10.4108/eai.12-10-2019.2292184>
- Razali, S. N., Ahmad, M. H., & Noor, H. A., M., (2020). Implications of learning interaction in online project based collaborative learning. *Journal of Computational and Theoretical Nanoscience*, 17(2-3), 681–688.
<https://doi.org/10.1166/jctn.2020.8831>
- Ratheeswari, K. (2018). Information and communication technology in education. *Indian Journal of Applied and Advanced Research*, 3(Suppl. 1), 45–47. <https://doi.org/10.21839/jaar.2018.v3iS1.169>
- Riasati, M. J., & Rahimi, F. (2018). Situational and individual factors engendering willingness to speak English in foreign language classrooms. *Cogent Education*, 5(1). <https://doi.org/10.1080/2331186X.2018.1513313>
- Richards, J. C. (2015). Technology in language teaching today. *Indonesian Journal of English Language Teaching*, 10(1), 18–32. <https://doi.org/10.25170/ijelt.v10i1.1506>
- Richards, J. C., & Renandya, W. A. (2002). *Methodology in language teaching: An anthology of current practice*. Cambridge University Press.
- Rojko, A. (2017). Industry 4.0 concept: Background and overview. *International Journal of Interactive Mobile Technologies*, 11(5), 77–90. <https://doi.org/10.3991/ijim.v11i5.7072>
- Sabiri, K. A. (2020). ICT in EFL teaching and learning: A systematic literature review. *Contemporary Educational Technology*, 11(2), 177–195. <https://doi.org/10.30935/cet.665350>
- Sabri, M., M., Z., (2018). Orai application to enhance language learning in speaking skill the observation at SMAN 1 Jerowaru Lombok Timur Nusa Tenggara Barat. *Proceedings of the Siliwangi International English Conference, "Innovation in Language Pedagogy and Assessment in Contemporary Asia: New Paradigms, Current Policies, Researches and Practices, August, Taskmalaya, Indonesia* (pp. 135–138).
- Safaruddin, S., Degeng, I. N. S., Setyosari, P., & Murtadho, N. (2020). The effect of PJBL with WBL media and cognitive style on students' understanding and science integrated concept application. *Jurnal Pendidikan. IPA Indonesia*, 9(3), 384–395. <https://doi.org/10.15294/jpii.v9i3.24628>
- Salameh, W., & Sathakathulla, A. A. (2018). The impact of social-economic factors on students' English language performance in EFL classrooms in Dubai. *English Language and Literature Studies*, 8(4), 110–118.
<https://doi.org/10.5539/ells.v8n4p110>
- Sari, A. B. P., Dardjito, H., & Azizah, D. M. (2020). EFL students' improvement through the reflective YouTube video project. *International Journal of Instruction*, 13(4), 393–408. <https://doi.org/10.29333/iji.2020.13425a>
- Saripudin, T. (2020). The implementation of Orai application in teaching speaking to senior high school students. *Journal of English Pedagogy, Linguistics, Literature, and Teaching*, 8(1). <http://dx.doi.org/10.35194/jj.v8i1.824>
- Shen, M.-Y., & Chiu, T.-Y. (2019). EFL learners' English-speaking difficulties and strategy use. *Education and Linguistics Research*, 5(2), 88–102. <https://doi.org/10.5296/elr.v5i2.15333>
- Simatupang, E. C. M., Hendar, & Supri, I. Z. (2019). The impact of using Oraiapp.com on improving students' speaking skill for non native speaker. *Universal Journal of Educational Research*, 7(4A), 22–26.
<https://doi.org/10.13189/ujer.2019.071404>
- Slavin, R. (2017). *Educational Psychology: Theory and Practice* (12th ed.). Pearson.

- Sosa Neira, E. A. Salinas, J., & De Benito, B., (2017). Emerging Technologies (ETs) in education: A systematic review of the literature published between 2006 and 2016. *International Journal of Emerging Technologies in Learning*, 12(5), 128–149. <https://doi.org/10.3991/ijet.v12i05.6939>
- Sosas, R., V. (2021). Technology in teaching speaking and its effects to students learning English. *Journal of Language and Linguistic Studies*, 17(2), 958–970. <https://doi.org/10.52462/jlls.66>
- Stoller, F. (2002). Project work: A means to promote language and content. In J. C. Richards & W. A. Renandya (Eds), *Methodology in language teaching: An anthology of current practice* (pp. 107–119). Cambridge University Press
- Sudjimat, D. A., Nyoto, A., & Romlie, M. (2021). Implementation of project based learning model and workforce character development for the 21st century in vocational high school. *International Journal of Instruction*, 14(1), 181-198. <https://doi.org/10.29333/iji.2021.14111a>
- Tay, S. I., Chuan, L. T., Aziati, A. H. N., & Ahmad, A. N. A. (2018). An overview of industry 4.0: Definition, components, and government initiatives. *Journal of Advanced Research in Dynamical and Control Systems*, 10(14), 1379–1387.
- Thuan, P. D. (2017). Project work for teaching English for ESP learners. *Proceedings of Innovation and creativity in teaching and learning foreign languages, Hi Chi Mihn City* (pp. 613–628).
- Tridinanti, G. (2018). The correlation between speaking anxiety, self-confidence, and speaking achievement of undergraduate EFL students of private university in Palembang. *International Journal of Education and Literacy Studies*, 6(4), 35-39. <https://doi.org/10.7575/aiac.ijels.v.6n.4p.35>
- Triwittayayon, T., & Sarobol, N. (2015). Factors enhancing English speaking ability: Perspectives from Thai high school students and their teachers. *Thaitesol Journal*, 31(1), 49-64.
- Vázquez Vargas, N., Aveleira Ortiz, J. L., Avila Ceballos, V. M. (2018). Project based learning in the technical and vocational education and training. *International Journal of Environmental & Science Education*, 13(9), 767–776. http://www.ijese.net/makale_indir/IJESE_2086_article_5bf180f608288.pdf
- Vo, T. Q. A., & Pham, T. T. N. (2021). Using technology to teach speaking skill online during time of Covid-19 outbreak in Vietnam-facts and recommendation. *Palarch's Journal of Archaeology of Egypt/Egyptology*, 18(7), 439–457. <https://archives.palarch.nl/index.php/jae/article/view/7753/7287>
- Wicaksono, A. (2018). Using video recording to improve students' speaking ability. *Proceedings of the International Conference on English Language Teaching (ICONELT 2017)*, 21–24. <https://doi.org/10.2991/iconelt-17.2018.5>
- Xie, X. (2016). The application of project-based learning in higher vocational computer courses. *Proceedings of the 2016 2nd International Conference on Education Technology, Management and Humanities Science*, 310–313. <https://doi.org/10.2991/etmhs-16.2016.69>
- Yuliansyah, A., & Ayu, M. (2021). The implementation of project-based assignment in online learning during Covid-19. *Journal of English Language Teaching and Learning (JELTL)*, 2(1), 32–38. <https://jim.teknokrat.ac.id/index.php/english-language-teaching/article/view/851/296>
- Ysuf, A. R. (2021). Implementation of online STEM-PjBL through various learning platforms in vocational high schools during Covid-19 pandemic. *Elementary Education Online*, 20(2), 1–8. <https://ilkogretim-online.org/index.php/pub/article/view/2741>

Appendix

Speaking Performance Assessment Rubric

Level	Description
8 Scale Score 190-200	<p>Typically, test takers at level 8 can create connected, sustained discourse appropriate to the typical workplace. When they express opinions or respond to complicated requests, their speech is highly intelligible. Their use of basic and complex grammar is good and their use of vocabulary is accurate and precise. Test takers at level 8 can also use spoken language to answer questions and give basic information. Their pronunciation and intonation and stress are at all times highly intelligible</p>
7 Scale Score 160-180	<p>Typically, test takers at level 7 can create connected, sustained discourse appropriate to the typical workplace. They can express opinions or respond to complicated requests effectively. In extended responses, some of the following weaknesses may sometimes occur, but they do not interfere with the message:</p> <ul style="list-style-type: none"> • minor difficulties with pronunciation, intonation, or hesitation when creating language • some errors when using complex grammatical structures • some imprecise vocabulary <p>Test takers at level 7 can also use spoken language to answer questions and give basic information. When reading aloud, test takers at level 7 are highly intelligible.</p>
6 Scale Score 130-150	<p>Typically, test takers at level 6 are able to create a relevant response when asked to express an opinion or respond to a complicated request. However, at least part of the time, the reasons for, or explanations of, the opinion are unclear to a listener. This may be because of the following:</p> <ul style="list-style-type: none"> • unclear pronunciation or inappropriate intonation or stress when the speaker must create language • mistakes in grammar • a limited range of vocabulary <p>Most of the time, test takers at level 6 can answer questions and give basic information. However, sometimes their responses are difficult to understand or interpret. When reading aloud, test takers at level 6 are intelligible.</p>
5 Scale Score 110-120	<p>Typically, test takers at level 5 have limited success at expressing an opinion or responding to a complicated request. Responses include problems such as:</p> <ul style="list-style-type: none"> • language that is inaccurate, vague, or repetitive • minimal or no awareness of audience • long pauses and frequent hesitations • limited expression of ideas and connections between ideas • limited vocabulary <p>Most of the time, test takers at level 5 can answer questions and give basic information. However, sometimes their responses are difficult to understand or interpret. When reading aloud, test takers at level 5 are generally intelligible. However, when creating language, their pronunciation, intonation, and stress may be inconsistent.</p>
4 Scale Score 80-100	<p>Typically, test takers at level 4 are unsuccessful when attempting to explain an opinion or respond to a complicated request. The response may be limited to a single sentence or part of a sentence. Other problems may include:</p> <ul style="list-style-type: none"> • severely limited language use • minimal or no audience awareness • consistent pronunciation, stress, and intonation difficulties • long pauses and frequent hesitations • severely limited vocabulary <p>Most of the time, test takers at level 4 cannot answer questions or give basic information. When reading aloud, test takers at level 4 vary in intelligibility. However, when they are creating language, speakers at level 4 usually have problems with pronunciation and intonation and stress.</p>
3 Scale Score 60-70	<p>Typically, test takers at level 3 can, with some difficulty, state an opinion, but they cannot support the opinion. Any response to a complicated request is severely limited. Most of the time, test takers at level 3 cannot answer questions and give basic information. Typically, test takers at level 3 have insufficient vocabulary or grammar to create simple descriptions. When reading aloud, speakers at level 3 may be difficult to understand. For more information, check the "Read Aloud Pronunciation and Intonation and Stress ratings."</p>
2 Scale Score 40-50	<p>Typically, test takers at level 2 cannot state an opinion or support it. They either do not respond to complicated requests or the response is not at all relevant. In routine social and occupational interactions such as answering questions and giving basic information, test takers at level 2 are difficult to understand. When reading aloud, speakers at level 2 may be difficult to understand. For more information, check the "Read Aloud Pronunciation and Intonation and Stress ratings."</p>
1 Scale Score 0-30	<p>Test takers at level 1 left a significant part of the TOEIC® Speaking Test unanswered. Test takers at level 1 may not have the listening or reading skills in English necessary to understand the test directions or the content of the test questions.</p>